

Executive Order 13274 Integrated Planning Work Group

Baseline Report and Preliminary Gap Analysis

Deliberative Draft

March 15, 2005

ICF Consulting conducted the research and prepared this draft report. The report was reviewed by the Integrated Planning Work Group and incorporates its comments and recommendations to the Task Force.

Acknowledgements

This report was prepared under the direction of the Executive Order 13274 Integrated Planning Work Group, whose membership included the following individuals.

Carol Adkins	Federal Highway Administration
Fred Bank	Federal Highway Administration
James Barr	Federal Transit Administration
Robert Bini	Federal Highway Administration
Mark Brucker	Environmental Protection Agency
Joseph Burns	US Fish and Wildlife Service
Ann Campbell	Environmental Protection Agency
Tanya Code	Environmental Protection Agency
Danyell Diggs	Federal Highway Administration
James Gavin	Environmental Protection Agency
Horst Greczmiel	Council on Environmental Quality
Patricia Haman	Environmental Protection Agency
John Humeston	Federal Highway Administration
Ellen G. LaFayette	US Forest Service
Carol Legard	Advisory Council on Historic Preservation
Lou Leibbrand	US Forest Service
Robert Mariner	Office of the Secretary of Transportation
Shari Schaftlein	Federal Highway Administration
Frank Smigelski	Federal Aviation Administration
Chip Smith	Department of Defense
Kirk Stark	US Army Corps of Engineers
Patrick Sullivan	Federal Aviation Administration
Ralph Thompson	Federal Aviation Administration

The report was prepared by the following ICF Consulting staff:

Sergio Ostria	Senior Vice President
Chester Fung	Senior Associate
Antonio Santalucia	Senior Associate
Mariana Arcaya	Research Assistant

Table of Contents

<i>Executive Summary</i>	<i>ES-1</i>
<i>1. Background and Introduction</i>	<i>1</i>
<i>2. Integrated Planning: Needs, Concepts, and Goals</i>	<i>4</i>
2.1 Current Approaches and New Challenges.....	6
2.2 What is Integrated Planning?	9
2.3 Primary Challenges to Integrated Planning	12
<i>3. Resolving Challenges: Capitalizing On Existing Opportunities</i>	<i>18</i>
3.1 Brief Overview of Transportation and Resource Planning.....	20
3.2 Taking Advantage of Relevant Resource Process Outputs	28
3.3 Other Strategies for Resolving Challenges	41
<i>4. Examples of Innovative Practice</i>	<i>47</i>
4.1 Florida: Efficient Transportation Decision-Making (ETDM) Process	49
4.2 Oregon: Major Bridge Replacement Program.....	52
4.3 Texas: Environmental Resource Stewards (TERS) and Ecological Assessment Protocol (TEAP)	54
4.4 Indiana: I-69 Long-Range Plan	56
4.5 North Front Range: Regional Plan.....	59
<i>5. Moving Toward an Integrated Planning Framework</i>	<i>62</i>
5.1 Integrated Planning Needs, Concepts, and Goals	63
5.2 Strategies For Needed Progressions	63
5.3 Federal Leadership Activities	64
5.4 Closing Words	65
<i>Appendices.....</i>	<i>67</i>
Appendix A: Commonly Used Acronyms	68
Appendix B: Integrated Planning Interview Participants.....	69

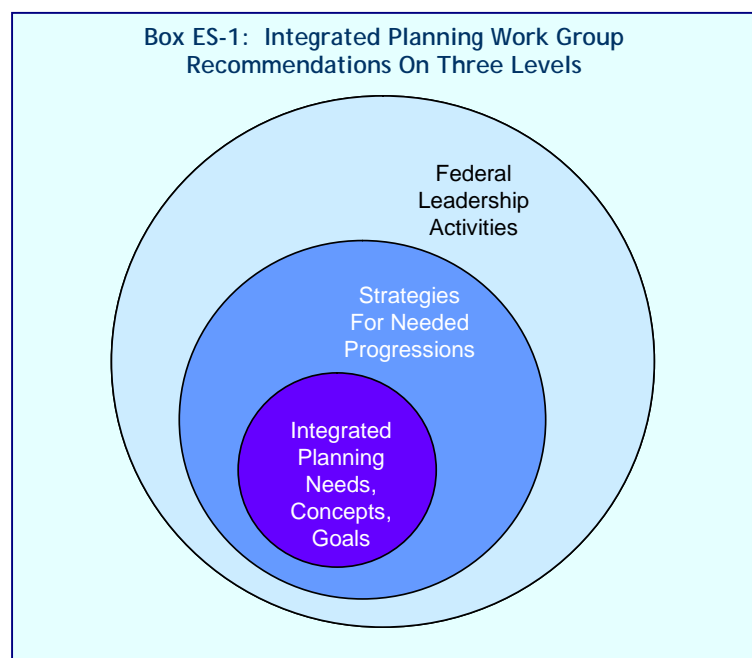
Executive Summary

On September 18, 2002, President George W. Bush signed Executive Order (EO) 13274, *Environmental Stewardship and Transportation Infrastructure Project Reviews*. This EO established an Interagency Task Force to advance current DOT and interagency environmental stewardship and streamlining efforts, to coordinate expedited decision-making related to transportation projects across federal agencies, and to bring high-level officials to the table to address priority projects. The Task Force established an interagency Work Group on Integrated Planning, which recognized the continuing need to more effectively “link” short and long-range transportation planning and corridor level planning studies performed by state and local governments with resource agency and land use planning processes, and with project-specific environmental reviews, approvals, and permitting processes.

Drawing on the results of literature reviews, practitioner interviews, and associated analyses conducted to meet the objectives of the tasks outlined above, this report (on Priority 1 – Establish Baseline – of the Work Group’s activities) presents a conceptual framework for integrated transportation planning; identifies opportunities for better linking land and resource planning processes with transportation systems planning; describes the challenges that inhibit an integrated approach, as well as approaches for resolving challenges and capitalizing on existing opportunities, identified by the workgroup; provides examples of innovative initiatives and practices that states and localities have implemented to forge integration; and discusses the types of federal action that can motivate the development and implementation of integrated transportation planning and project development processes.

This report identifies three levels of recommendations for consideration by the Interagency Task Force. As depicted in Exhibit ES-1, the three levels include:

1. Recommendations on the components of an integrated planning framework and the associated objectives and outcomes that should be pursued and that should ensue;
2. Recommendations on the types of strategies that can be implemented readily to achieve objectives and to make progress toward integrated decision-making; and
3. Recommendations on specific Federal government activities to begin forging an integrated planning approach.



Integrated Planning Needs, Concepts, and Goals

Integrated transportation planning is about a collaborative, well-coordinated decision-making process that solves the mobility and accessibility needs of communities in a manner that optimizes across multiple community goals—from economic development and community livability to environmental protection and equity. It is about providing users of transportation systems with choices, and about providing information on the performance of transportation networks and facilities that reflects what customers value most.

As depicted in Exhibit ES-2, an integrated planning framework is characterized by the following elements:

- **Integration with land use planning and across transportation modes and capacity enhancement options.** Looking at transportation as a system requires a more careful and robust assessment of the various options available to planners and decision-makers for addressing accessibility, safety, and mobility needs. To do that, transportation professionals need a process that integrates transportation and land use. The use of tools such as FHWA's Scenario Planning can assist transportation professionals in integrating transportation and land use and guide consideration of alternative solutions, from operations to land use measures.¹
- **Integration of the transportation system with other human and natural systems.** As part of the planning process, the manner in which transportation interacts with other systems that constitute our rural and metropolitan areas, such as urban, economic, ecological, and other infrastructure, needs to

Box ES-2: A Note About Aviation and Surface Transportation Planning

There is a significant and notable distinction between the laws, policies, processes and procedures used in surface transportation planning and those used in aviation system planning. For instance, while FAA recommends that aviation planning be conducted by many levels of government, in practice planning is conducted mostly by individual airports and FAA, rather than state or regional transportation planning agencies, with FAA approving important airport planning documents.

Although the concepts presented in this report are generally applicable to aviation planning as well as surface transportation planning, some exceptions exist that stem from differences in how surface and aviation planning are carried out. These exceptions will be noted where differences between surface and aviation transportation planning apply.

Box ES-3: Integration For Small Planning Processes

The level of effort required for the planning integration activities described in this report is within the range for activities that are already undertaken for complex transportation projects and plans. However, there should also be recognition that this level of effort may not be appropriate for smaller planning processes that have smaller impacts and are already strained by resource constraints. For instance, there are thousands of small airports nationwide that retain very few staff and undertake plans and projects that do not have major off-site impacts. For these airports, extensive integration and public participation activities may not yield commensurate benefits. And in surface transportation, a similar consideration applies to mid-sized and smaller MPOs, as well as rural areas. These considerations concerning smaller planning processes should be front and center as recommendations are made for advancing the state of planning practice.

¹ Scenario planning is a process in which transportation professionals and citizens work together to analyze and shape the long-term future of their communities. Using a variety of tools and techniques, participants in scenario planning assess trends in key factors such as transportation, land use, demographics, health, economic development, environment, and more. The participants bring the factors together in alternative future scenarios, each of these reflecting trend assumptions and tradeoff preferences. In the end, all members of the community—the general public, business leaders, and elected officials—reach agreement on a preferred scenario. This scenario becomes the long-term policy framework for the community's evolution, and is used to guide decision-making.

be addressed in a more holistic fashion by using integrated institutional arrangements and more collaborative and better-coordinated decision-support processes.*

- **Integration of transportation systems planning with transportation programming and project development.** Integration of transportation system planning processes and project planning and development processes would help to ensure that the best possible projects are implemented in a timely manner, and that these projects best optimize across social, environmental, and economic goals.
- **Performance monitoring and evaluation.** Integrated planning requires effective and transparent monitoring of implemented solutions and by extension the development of relevant measures to project and then track the performance of transportation strategies, facilities, corridors, and networks for progress toward both environmental and transportation goals.

The spirit of the laws and regulations that govern surface and transportation and aviation systems planning, programming, and project development are consistent with the objectives and desired outcomes of integrated planning frameworks. Yet, a number of important challenges must be overcome.

- **Transportation planning processes are struggling to achieve a “transportation-as-a-system” perspective.** A holistic approach to improving the transportation system has yet to take hold in common transportation planning practice.
- **Institutional and political conditions are difficult to navigate.** Transportation planning, construction, and operations functions have been compartmentalized into disparate local and state agencies, making it difficult for multiple decision-makers to form plans, programs, and projects that are optimal for the system as a whole. Political considerations can also create challenges for a holistic approach, sometimes heavily favoring large new infrastructure investments.
- **Public participation processes are not well-developed.** Visioning components that incorporate extensive public input are not yet commonplace in transportation planning practices.
- **Modeling and other analysis tools continue to warrant refinements.** Vast improvements have been made since the advent of computer modeling, but continual and further advancements are needed to help communities and agencies better understand the interactions between land use, transportation demand, transportation capacity, and environmental systems.

* While this type of integration is desirable in surface transportation, where planning occurs on a regular basis, in aviation the process is driven by airport master planning, which occurs every five to ten years or when airports are planning development with limited off-airport impacts. Because airport master planning is an airport-sponsor-driven process, FAA does not require that such planning eliminate alternatives based on cost, social, or environmental grounds unless the alternatives are determined to be unreasonable or unfeasible. Such considerations are applied to alternatives during the environmental process.

Exhibit ES-2: Examples of Integrated Planning Objectives and Outcomes		
Element	Objectives	Outcomes
<i>Integration with land use planning and across transportation modes and capacity enhancement options</i>	<ul style="list-style-type: none"> Develop integrated, multimodal solutions coordinating land use and transportation Integrate across capacity enhancement approaches Measure performance from customer and social perspectives Promote the use of scenario planning as a tool to consider a range of alternative land use and transportation scenarios. 	<ul style="list-style-type: none"> A broad range of potential solutions, including operational/efficiency improvements, transit, walk/bike, land use, aviation and highway capacity, and demand management* are fully considered Transportation priorities are established to support broad visions for how we want our neighborhoods, towns, and regions to prosper The public is involved and engaged throughout the decision-making process in the development of goals, and in the implementation of solutions
<i>Integration of the transportation system with other natural and human systems</i>	<ul style="list-style-type: none"> Recognize environmental constraints Improve the analysis of environmental impacts, especially those that are broader and less project-specific, and the integration of environmental goals into decisions Optimize across environmental, economic, social objectives Visualize footprints and broad impacts that are not ground-based and screen alternatives for fatal flaws 	<ul style="list-style-type: none"> Transportation and resource agencies work collaboratively to ensure that early consideration is given to equity, safety, mobility, accessibility, environmental, economic, fiscal, community, and land use goals The public is involved and engaged throughout the decision-making process in the development of goals, and in the implementation of solutions Development of solutions to transportation needs harmonizes and integrates economic, safety, mobility, social, and environmental objectives
<i>Integration of transportation planning with transportation programming and project development</i>	<ul style="list-style-type: none"> Select strategies via a systems-based approach Focus mitigation to achieve optimal balance across objectives Use context sensitive approaches for project design and delivery Accelerate NEPA review and the implementation of projects, reduce agency resource demands 	<ul style="list-style-type: none"> Strategies and project decisions are consistent with plans and satisfy commitments made in planning and project development Strategies and projects focus on environmental performance, community goals, fiscal, and economic performance, rather than on narrow impact mitigation The environmental review process is accelerated, and is based on clear and firm decision points that are aided by input from multiple stakeholders and that reduce project delivery delays The best technical, analytical, and policy skills are applied in all aspects of transportation project management (from planning to implementation), and project cost estimates and benefits are accurate The public is involved and engaged throughout the decision-making process in the development of goals, and in the implementation of solutions
<i>Performance Monitoring and Evaluation</i>	<ul style="list-style-type: none"> Develop collaborative processes grounded on common goals and objectives Ensure that commitments are carried over into the projects that are implemented Use mutually agreed upon performance measures to track the effects of implemented solutions 	<ul style="list-style-type: none"> A high level of trust characterizes interactions between transportation and resource agencies Commitments made early in the planning process help shape the design, development, and implementation of transportation projects Mitigation of unavoidable impacts is focused and decisions made in planning are seldom revisited, minimizing duplication of efforts; mitigation is carried out and is successful or augmented Agencies are held accountable for their decisions, in part through reporting and rewards for good performance The public is involved and engaged throughout the decision-making process in the development of goals, and in the implementation of solutions
* Note that demand management strategies are of limited application for aviation.		

- **Transportation planning processes are struggling to more proactively optimize across environmental, social, and economic objectives.** Growth pressures inextricably link transportation with land use, but planning for each occurs separately from the other. This same disconnect also occurs with respect to the development of resource conservation plans.

Likewise, for transportation decision-making processes to fully capitalize on existing opportunities to more effectively incorporate social, economic, and environmental considerations, evolutions are needed to move forward the state of resource planning practice.

- **More emphasis on regional scale resource analysis and protection.** Current resource conservation processes tend to focus on site-specific needs, but this approach creates incomplete knowledge about the most critical resources in a particular geographic area, and requires expending the same amount of effort for all projects, regardless of any differences in the impact one project might have over another.

Box ES-4: Integrated Planning Challenges

In addition to challenges facing transportation and resource planning, there are practical challenges to better interagency coordination that, if addressed, would translate into significant gains toward a more integrated planning approach. The following integrated planning challenges have been identified:

- Agencies are unaware of the planning outputs of other agencies.
- Mechanisms and legal frameworks to engage resource agencies early in transportation systems planning are generally lacking.
- Resource agency structures and cultures do not actively support involvement in integrated planning processes.
- Societal state of the art knowledge of ecosystem function and relationships is limited.
- Agencies are constrained by available resources.
- Local land use is sensitive to fiscal, economic, and political constraints.

- **More comprehensive resource inventories.** The current lack of a landscape-scale, regional perspective also results in incomplete inventories of natural and cultural resources. A single, comprehensive source for environmental information capable of being shared and updated among numerous agencies could serve as the cornerstone of integrated planning processes, informing discussions about interactions between human and environmental systems.
- **More environmental considerations in local land planning.** Local land planning is a major component to integrated planning, but currently does not support an integrated approach. Integrated planning is greatly facilitated when cultural and natural resource goals and information are incorporated holistically into land use decision processes, enabling better optimization across multiple objectives.

Strategies for Needed Progressions

The strategies for accomplishing the desired objectives and outcomes of integrated planning, and for overcoming challenges such as those discussed above and in Box ES-2,

would vary necessarily from one community to another. However, as a first step, this baseline development effort has identified the following general strategies for more integrated processes.

- **Use each other's planning outputs.** In order to ensure a more collaborative process and to provide the basis for early consideration of the effects of alternative transportation solutions on environmental, community, and cultural resources, it is imperative that transportation agencies increase their fundamental understanding of resource planning processes. It is also crucial that resource agencies understand how they can participate in, and contribute to, the development of transportation plans and programs, and that opportunities are created for them to do so.

Two general types of outputs from environmental resource planning are potentially useful in transportation planning and will require resources in staffing, time, and money to collect, collate and maintain. The first is the collection of outputs from the project environmental review and permitting process, which serve as the basis for permitting, determinations, and other environmental clearances. These outputs take a site-specific analysis perspective, and may not by themselves provide a complete picture of natural and cultural resource information on a landscape scale. But these outputs could be collected over a number of previous projects, and work could be done to produce similar analysis on a more landscape-scale basis, to construct a picture of the natural and cultural resource landscape that could be useful in informing integrated transportation system planning processes.

The second is the collection of outputs produced by the planning activities of resource agencies. Such activities are less common than project review products, because of the reasons discussed above in relation to resource agency authority and responsibilities. But some resource outputs do exist and stand as potential inputs to the transportation decision-making process. Additional efforts could also be invested to strengthen the kinds of resource planning outputs that are available for inclusion in transportation planning.

Exhibit ES-3 lists the process outputs that hold potential as additional inputs to advance transportation system planning and decision-making processes.

Exhibit ES-3: Resource Process Outputs Relevant to Transportation Planning		
Planning Process	Process Outputs	Relevance to Transportation Planning
Air Quality	<ol style="list-style-type: none">1. Air Quality Plan2. Transportation Conformity Analysis3. General Conformity Analysis4. NEPA Analysis	<ul style="list-style-type: none">• Critical to project development• Driven by regulatory requirements

Exhibit ES-3: Resource Process Outputs Relevant to Transportation Planning		
Planning Process	Process Outputs	Relevance to Transportation Planning
Fish and Wildlife Conservation	<ol style="list-style-type: none"> 1. Species Recovery Plan 2. Species GIS Inventory 3. Habitat Conservation Plan 4. Essential Fish Habitat Designation 5. Endangered Species Act Section 7 Consultation 6. Essential Fish Habitat Consultation 7. DOT Section 4(f) Evaluation 8. NEPA Analysis 9. State Comprehensive Wildlife Conservation Plans/Strategies 	<ul style="list-style-type: none"> • Can serve as the basis for setting environmental capacity constraints • Can help to identify footprints of alternative transportation strategies • Can be used to inform visioning, alternatives development & assessment, performance measurement, and preferred strategies
Historic Preservation	<ol style="list-style-type: none"> 1. State Historic Resources Inventory 2. NHPA Section 106 Analysis 3. DOT Section 4(f) Evaluation 4. NEPA Analysis 	
Watershed	<ol style="list-style-type: none"> 1. Special Area Management Plan 2. Local Watershed Plan 3. TMDL Process 4. Clean Water Act Section 404 Analysis 5. DOT Section 4(f) Evaluation* 6. NEPA Analysis 	
Land	<ol style="list-style-type: none"> 1. Local comprehensive plan 2. Forest Plan 3. Resource Management Plan 	<ul style="list-style-type: none"> • Serve as major driver of transportation needs • Can be used to ensure that land development patterns and transportation systems are consistent with environmental goals and with each other.

* Section 4(f) applies only to those water bodies that are designated for recreational use.

- **Develop innovative institutional mechanisms.** There is a multitude of federal, state, and local government agencies that have a stake on the outcomes of transportation plans, programs, and projects. Integrated planning requires collaboration across agencies. Strong and effective leaders that have the achievement of community goals and objectives as their number one mission must forge that collaboration.

One example of an innovative institutional mechanism is the development of executive task forces comprised of leaders from the various interested agencies and whose mandate is to, in collaboration with implementing staff, forge a vision for an integrated decision-making process. These task forces can also be helpful in identifying agency-specific ‘champions’ who can then institute the organizational shifts necessary to direct resources toward integrated planning. It is imperative that the vision for integrated planning come from the top, and that those responsible for crafting goals and objectives can hold accountable those responsible for implementing strategies and tactics.

Likewise, Inter-agency Memoranda of Understanding (MOUs) and Agreement (MOAs) can ‘reserve a seat at the transportation planning table’ by clearly defining the ways in which agencies will interact with each other throughout the planning process, and the commitments to which agencies pledge to adhere as plans are

developed and projects are programmed and implemented. However, a 'seat at the table' is not effective unless resource agencies are able to expend staff resources toward that involvement. Mechanisms to share staff resources across agencies, such as transfer-funded positions, have allowed state DOTs to fund specific positions at resource agencies that then can be dedicated solely to FHWA/FTA project review responsibilities.

- **Take advantage of state-of-the-art technology.** A range of tools, including Geographic Information Systems (GIS) and Remote Sensing, can be used to replace manual collection and integration of some of traffic, environmental, and community data. These tools are capable of assembling, storing, manipulating, displaying, and sharing geographically referenced information, and allow for integration of some transportation, social, economic, and environmental data as a means to take an integrated perspective in developing plans, programs, and projects. In order to maximize the effectiveness of such tools, we need robust data sets which, in some cases, are currently incomplete, and which are generally dispersed among disparate sources.

Decision support systems that computerize program and project management work and guide users through review and documentation processes could help to simplify transportation and environmental planning processes and ensure that all considerations are taken into effect in an integrated manner. There are a number of states that are in the process of deploying advanced information systems to improve the transportation decision-making process. The most innovative of these are bringing together information available from resource agencies on sensitive habitats, endangered species, cultural resources, watersheds, and the like to ensure a more integrated approach to transportation planning. It is evident from such efforts that integrated transportation planning will rely on advanced information systems that are available today. Scenario planning tools such as PLACES³ and CommunityViz that have been integrated into the GIS environment could also be used as a decision support system taking in the consideration of land use and transportation scenarios.

A key component of such systems concerns the process used to share and disseminate information. Data-sharing processes must be constructed in such a way that preserves the sensitive nature of certain data, while infusing the transportation planning process with information to be utilized in an integrated approach that is accessible and transparent to all stakeholders.

- **Ensure an effective and transparent decision-making process.** Aspects of decision-making include planning processes and requirements; the institutional relationships behind them; access to the information outputs from all involved agencies (transportation and resource agencies alike); and the analytical tools, performance measurement, and public involvement that support them. These aspects are important for addressing the complex and sometimes contradictory social, economic, mobility, and environmental goals expressed by communities. Added to this complexity is the number of agencies involved in the transportation decision-making process, and the diverse mandates and functions that determine their activities

in response to community goals. These conditions complicate the task of developing transportation solutions that reflect the full demands of customers (i.e., high-quality transportation facilities and networks, as well as high-quality environmental stewardship), highlighting the need for an effective and transparent decision-making process. And because land use is such an integral component of the overall human and ecological system, any integrated planning effort will need to include strong linkages with local land planning processes in addition to transportation and resource linkages in order to ensure an effective, comprehensive planning and decision-making process. In order to ensure an effective and transparent decision-making process, public involvement is critical. FHWA's Transportation Planning Capacity Building program has introduced a new "Planning Assistant Tool," which is a self-diagnostic tool to help form ideas, identify techniques, and organize notes for public involvement activities.

The outcomes of effective decision-making processes are project decisions that optimize across multiple objectives, including social equity, economic development, fiscal responsibility, mobility, safety, accessibility, environmental quality, and community quality of life, and make use of all appropriate modal, land use, or technology options to provide timely and workable transportation solutions. Ensuring that 1) there are multiple points of coordination amongst the multitude of agencies that affect the process, 2) commitments made early—at the planning stages—are sustained throughout the process into project design, development, implementation, and operation, and 3) planning results can support strong, specific, realistic, well-connected purpose and need statements and impact assessments, is critical to achieving a seamless overall process.

Federal Leadership Activities

The federal government can play a key role in ensuring that such practice becomes the norm rather than remaining the exception. By mobilizing the federal government's resources and influence, federal agencies can 1) ensure that the spirit of current laws and regulations governing transportation planning, which inherently support integrated approaches, is carried over into practice, 2) motivate collaboration and coordination amongst relevant federal agencies, 3) organize and mobilize resources to develop advanced information systems, 4) develop and deliver capacity-building programs that draw on the experiences and data of state and local transportation and environmental resource agencies, 5) fund pilot projects on innovative decision-making processes that push the envelop and that can serve as applied laboratories, and 6) promote implementation of insightful analysis and performance measures.

Based on the work that has been undertaken as part of this baseline development effort, a number of actionable recommendations for consideration by the Interagency Task Force have been formulated. They are as follow.

- **Provide executive-level direction on inter-agency collaboration.** Current institutional arrangements and cultures must evolve for integrated planning to permeate transportation planning practice. Executive-level leadership can have a

cascading effect on organizations, and is a powerful mechanism for the Interagency Task Force to promote integrated planning. Grounded on current legal and regulatory frameworks and the experiences of state and local agencies that have pursued different approaches to decision-making, it is recommended that the Task Force design executive-level collaboration strategies and develop and disseminate guidance on institutional coordination that ‘field’ practitioners (federal, state, and local) can use to develop more effective institutional approaches.

- **Develop technical guidance and complementary capacity-building programs on integrated planning.** The process mapping exercise and interviews that were conducted as part of this baselining effort indicate that agencies need to increase their fundamental understanding of each others’ planning processes and associated outputs. Methods are needed for assuring that the outputs of environmental resource plans are used to inform transportation planning. Furthermore, a range of strategies are available for achieving the objectives and outcomes that should characterize integrated planning. It is recommended that the Interagency Task Force develop such methods and strategies, including improved analysis tools and system performance measures, and prepare and disseminate guidance on their application. This should build on work related to the application of technology, such as GIS and remote sensing. Additional options include more regularly providing available regional resource planning outputs to local and state governments as input to their transportation and local land use planning efforts.
- **Develop policy guidance that clarifies how current laws and regulations encourage integrated transportation planning.** It is clear that the current laws and regulations that govern transportation planning recognize the need and set the basis for integrated planning. Yet, a succinct, targeted statement that clarifies and demonstrates how current laws and regulations support integrated transportation planning is not available to guide practitioners. It is recommended that such guidance be developed for both surface transportation and aviation systems planning to ensure that visionary and proactive leaders at the state and local levels have the basis that is necessary to forge cultural change, and to help practitioners better understand how to move toward an integrated approach.

1. Background and Introduction

On September 18, 2002, President George W. Bush signed Executive Order (EO) 13274, *Environmental Stewardship and Transportation Infrastructure Project Reviews*. This EO established an Interagency Task Force to advance current DOT and interagency environmental stewardship and streamlining efforts, to coordinate expedited decision-making related to transportation projects across federal agencies, and to bring high-level officials to the table to address priority projects. The interagency Task Force identified three areas where federal coordination and decision-making can improve the transportation project development process: 1) project purpose and need, 2) indirect and cumulative impacts, and 3) integrated planning. The Task Force established an interagency Work Group for each of these areas to focus efforts on overcoming challenges to coordination and to develop process improvements.

Recognizing that the overarching goal of the EO is *to promote environmental stewardship in the nation's transportation system and expedite environmental reviews of high-priority transportation infrastructure projects*, the efforts of the Work Groups are designed to accomplish the following:

- First, the products developed by the Work Groups should provide clear and actionable recommendations that the Task Force can use to forge improvements to the transportation decision-making process. More specifically, the Task Force will seek direction from the Work Groups on the necessary improvements to the development of purpose and need statements, the analysis of indirect and cumulative impacts, and the development of integrated plans. That direction must be compiled and presented in a way that enhances the ability of the Task Force to effect change—for example, through the formulation of new policy or more collaborative decision-making.
- Second, the products developed by the Work Groups should enhance the project development process that is undertaken by practitioners. Specifically, approaches for improving statements on purpose and need, analyses of indirect and cumulative impacts, and development of integrated plans must be communicated to practitioners in a way that enhances their ability to develop better transportation projects in a more timely and cost-effective fashion. Consequently, the focus on innovative practices, training programs, guidance materials, and other types of information dissemination techniques is prevalent in each Work Groups' work plan.

In forming the Integrated Planning Work Group (IP WG), the Task Force recognized the continuing need to more effectively “link” short and long-range transportation planning and corridor level planning studies performed by state and local governments with resource and land use agency planning processes, and with project-specific environmental reviews, approvals, and permitting processes. To guide its efforts, the IP WG developed a work plan outlining its priorities. The work plan prioritized the IP WG's activities into four groups:

- Priority 1 – Establish Baseline
- Priority 2 – Assess Resource Levels

- Priority 3 – Review Tiered Documents
- Priority 4 – Implementation

This report presents the results of activities on Priority 1–Establish Baseline, which has involved the execution of the following tasks.

1. A description of relevant planning processes. The objectives of this task were to define, at a macro scale, the planning processes that affect transportation project development and delivery, and to assess where opportunities for linkages between transportation, land use, and natural and cultural resources planning exist. In addition to highway, transit, and airport planning, those planning processes identified as the highest priorities by the WG, and evaluated as part of this report, are:²
 - Air Quality Planning,
 - Cultural Resources/Traditional Cultural Properties (TCPs) Planning,³
 - Endangered Species/Fish/Plant/Wildlife Management,
 - Land Use/Land Management Planning, and
 - Watershed Planning.
2. A description of current laws and regulations. The objectives of this task were to review current laws and regulations that influence planning processes and project decisions, and to identify legal or regulatory barriers (if any) that inhibit an integrated approach to transportation planning.⁴
3. The development of a compendium of innovative practices. The objective of this task was to highlight efforts to develop a more integrated, systems-oriented approach to transportation decision-making, and to demonstrate how integrated approaches are being designed and implemented in the field by practitioners.

Drawing on the results of literature reviews, practitioner interviews, and associated analyses conducted to meet the objectives of the tasks outlined above, this report presents a conceptual framework for integrating transportation system planning; identifies opportunities for better linking resource and land planning processes with transportation systems planning; describes the challenges that inhibit an integrated approach, as well as approaches for resolving challenges and capitalizing on existing opportunities, identified by the workgroup; provides examples of innovative initiatives and practices that states and localities have implemented to forge integration; and discusses the types of federal

² These five types of planning processes were identified as high priorities primarily because they are all issues that commonly need to be addressed in NEPA analyses typically prepared during the project development process, and therefore have the most relevance to streamlining and environmental stewardship efforts being promoted under the EO.

³ While it is noted that, strictly speaking, there are differences between “Cultural Resources/TCPs” and “Historic Preservation,” the more common term “Historic Preservation” and broader term “cultural resources” are used throughout this document.

⁴ FHWA and FTA recently issued a joint memorandum entitled “Integration of Planning and NEPA Processes” which clarifies the legal basis for stronger linkages between transportation planning and NEPA processes.

action that can motivate the development and implementation of integrated transportation planning and project development processes.

Exhibit 1 summarizes the structure and content of the remaining chapters of this report.

Exhibit 1: Report Structure and Content Summary		
Chapter	Content Summary	Issues Covered
2. Integrated Planning: Needs, Concepts, and Goals	<ul style="list-style-type: none">• Sets the vision for integrated planning• Provides the basis for the remainder of the report	<ul style="list-style-type: none">• Why do we need to move toward an integrated planning framework?• What do we mean by integrated planning?• What would transportation planning look like under such a framework, and what would be the outcomes?• What are the primary challenges that currently limit our progression toward integrated planning?
3. Resolving Challenges: Capitalizing on Existing Opportunities	<ul style="list-style-type: none">• Describes current state of resource & transportation planning• Highlights opportunities for linkages by using the outputs from resource planning as inputs into transportation planning• Discusses institutional, technical, and decision-making progressions needed to take advantage of linkage opportunities	<ul style="list-style-type: none">• What are the primary problems with current transportation planning processes?• How can outputs from different processes be used to improve transportation decision-making?• What progressions are needed in resource planning to improve outputs?• What type of institutional evolution is needed to ensure that outputs are integrated in?• What is the best mechanism to bring relevant data and information and analysis, generated by resource agencies, into transportation plans and processes?• What are the implications of innovative institutional approaches and data sharing on the project development process?
4. Examples of Innovative Practices	<ul style="list-style-type: none">• Demonstrates real-world practices for forging an integrated approach	<ul style="list-style-type: none">• What are regions across the country doing to forge integrated plans?• What has been the role of resource agencies?• What are the lessons learned and the pitfalls that should be avoided?
5. Moving Toward an Integrated Planning Framework	<ul style="list-style-type: none">• Discusses (at a general level) the types of Federal government actions that can get the “ball rolling”	<ul style="list-style-type: none">• What types of Federal-level programs could be considered?• Are changes in law and regulation necessary? If so, what types?• What is the potential role of the Interagency Task Force?

2. Integrated Planning: Needs, Concepts, and Goals

There is significant and growing concern on the part of both the private and public sectors about the future performance of our nation's transportation system. Consider the following.

- Between 1980 and 2001, vehicle miles traveled (VMT) grew from 1.43 to 2.78 trillion miles, an increase of 82 percent. During that same time frame, the physical supply of roadways, as captured by roadway lane-miles, increased by less than 4 percent. Consequently, peak-period highway congestion for passenger and commercial vehicles doubled from 1982 through 2000.⁵ By 2020, passenger VMT is expected to grow by nearly 20 percent, while the demand for trucking, as measured by ton-miles, is expected to grow by over 60 percent.⁶
- Over that same period, air-passenger miles more than doubled, and by 2014 air passenger enplanements may see increases of 50 percent. Growth at these rates will severely test the future efficiency of air traffic operations in an aviation system already characterized by frequent delays and heightened security measures. This growth will also strain the surface transportation system connected with airports.
- From 1996 to 2001, public transportation ridership increased by 22 percent, and the 9.5 billion passenger trips made on transit systems across the nation in 2001 were the most in 40 years. According to the U.S. Department of Transportation, in today's dollars, \$20.6 billion is needed annually to maintain and improve performance of the nation's transit systems.⁷
- Since 1980, Class I railroads consolidated from 22 carriers to 7, the number of locomotives decreased by 29.7 percent, the number of freight cars decreased by 23 percent, and the amount of rail line also has contracted substantially (from 164,822 miles to only 142,633—a decrease of 13.5 percent).⁸ All of this has occurred at a time when rail freight demand (as measured by ton-miles) increased by 63 percent.

Box 1: A Note About Aviation and Surface Transportation Planning

There is a significant and notable distinction between the laws, policies, processes and procedures used in surface transportation planning and those used in aviation system planning. For instance, while FAA recommends that aviation planning be conducted by many levels of government, in practice planning is conducted mostly by individual airports and FAA, rather than state or regional transportation planning agencies, with FAA approving important airport planning documents.

Although the concepts presented in this report are generally applicable to aviation planning as well as surface transportation planning, some exceptions exist that stem from differences in how surface and aviation planning are carried out. These exceptions will be noted where differences between surface and aviation transportation planning apply.

⁵ General Accounting Office, Freight Transportation: Strategies Needed to Address Planning and Financing Limitations, December 2003.

⁶ NCHRP 20-24(33)A, *2010 and Beyond: A Vision of America's Transportation Future (21st Century Freight Mobility)*, prepared by ICF Consulting, August 2004.

⁷ <http://www.apta.com/research/stats/overview/overview.cfm>

⁸ Association of American Railroads; *Railroad Facts*, 2002 Edition.

- Driven by globalization,⁹ our nation's ports and channels are becoming increasingly congested as ever greater amounts of freight are moved through a system with limited means for physical capacity expansion. From 1990 to 2000, tonnage at U.S. ports increased by 13.8 percent,¹⁰ while capacity expanded only marginally. In fact, considerable resources were required merely to maintain physical capacity through efforts such as dredging.

As traffic congestion continues to increase under the pressure of growing travel demand, the future performance of our transportation networks, in terms of safety, efficiency, and reliability, has become a pressing concern. In some cases—highways, for example—travel demand management¹¹, improved operations, ITS, and other innovative approaches may be able to reduce the demand for new capacity in specific locations. But those measures may not be able to meet all of the capacity demands of businesses and the traveling public. There will continue to be places where few options exist to accommodate growing personal travel and freight movement beyond additions to the highway system, either as new roads or expanded capacity on existing roads. Likewise, measures to improve the effective carrying capacity of our transit systems, airports, railways, and ports can help, but may not be sufficient to accommodate expected increases in demand.¹² Without careful consideration to the performance of our system in matching transportation demand and carrying capacity, congestion resulting from growth in transportation demand may erode economic productivity and quality of life across many of our communities.

At the same time, additional use and new facilities can negatively affect natural and cultural resources. Such effects may include destruction of wetlands, degradation of wildlife habitat, increases in air pollutant emissions, conversion of parklands and open space, or loss of historic properties. These impacts can also ultimately affect the quality of life in our communities. As a result, quality of life and resource preservation have become high-priority goals in many communities. The effects of transportation on natural

⁹ Between 1970 and 1999, trade's share of GDP increased from 10.7 percent to 26.9 percent.

¹⁰ U.S. Department of Transportation, Bureau of Transportation Statistics, National Transportation Statistics, 2002.

¹¹ While a full discussion of travel demand management (TDM) is beyond the scope of this report, it is noteworthy that many strategies are available that can reduce or fulfill demand for transportation without increasing the capacity of the existing transportation system. In some cases, such strategies can translate into substantial savings over capacity improvements. The range of TDM strategies encompasses smaller-scale options such as incentives for telecommuting and staggered work hours to larger-scale options such as road pricing and land use changes. The following are additional resources on TDM :

Federal Highway Administration. "Mitigating Traffic Congestion: The Role of Demand-Side Strategies." Prepared by the Association for Commuter Transportation, Urbantrans Consultants, Parsons Brinckerhoff, and ESTC. September 2004.

Transportation Research Board. "The Congestion Mitigation and Air Quality Improvement Program: Assessing 10 Years of Experience." Special Report 264. Washington, Dc: National Academy Press, 2002.

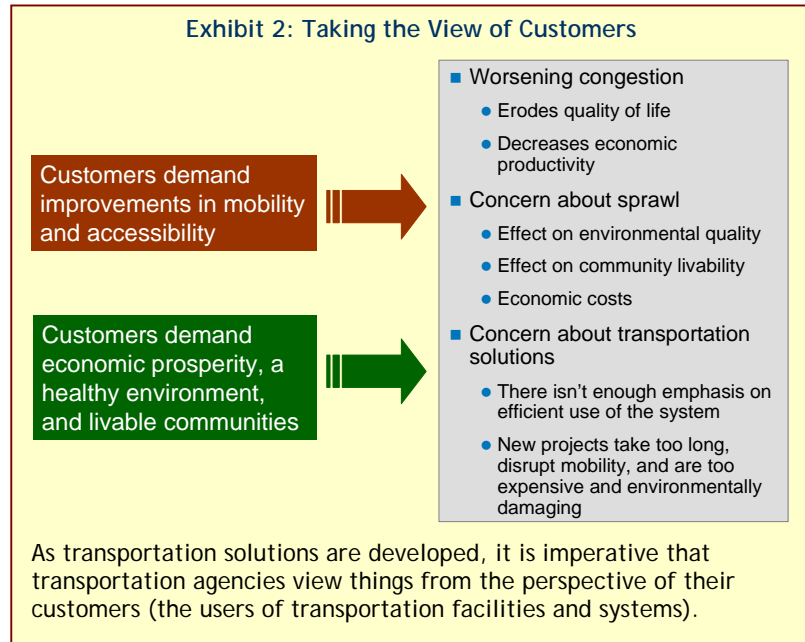
National Association of Regional Councils. "Costs and Effectiveness of Transportation Control Measures (TCMs): A Review and Analysis of the Literature." Prepared by Apogee Research, Inc. January 1994.

¹² While this effort to improve carrying capacity is relevant across all of these modes of transportation, airport capacity is a concern only at approximately 50 major airports nationwide.

and cultural resources therefore necessitate that careful consideration be given to improvements to the transportation system.

As depicted in Exhibit 2, users of the nation's transportation system—the customers of transportation agencies at all levels—are demanding improvements in mobility and accessibility, and at the same time a healthy environment and livable communities. These demands often are regarded as conflicting because of concerns about the potential adverse effects of transportation

investments on our natural and human resources. Consequently, the challenge to transportation agencies across all levels of government, federal, state, and local, can be articulated as follows.



*How can government ensure that the efficiency and reliability of the transportation system are optimized while concurrently adhering to the environmental goals and objectives of our society? More specifically, given the goals of environmental laws and regulations and the sometimes strong undercurrent of opposition to new infrastructure investments, how can transportation agencies provide the additional capacity that customers demand in a timely and equitable fashion **and** meet society's environmental goals and objectives?*

2.1 Current Approaches and New Challenges

Section 1309 of TEA-21, Environmental Streamlining, directed the U.S. Department of Transportation to address concerns related to delays, unnecessary duplication of effort, and added costs associated with current environmental analyses and approval processes for surface transportation. Section 304 of Vision 100 addresses environmental streamlining for aviation projects. Inherent in these directives was the hypothesis that current project development processes experience project delivery delays and unexpected high project costs that can be attributed, to an extent, to the process effects of environmental planning requirements. While this may be the case, it is becoming increasingly clear that there are more fundamental problems with the transportation decision-making process than just the effects of environmental laws and regulations. For example, a recent American Association of State Highway and Transportation Officials

(AASHTO) study¹³ noted that 92 percent of environmental documents processed by State DOTs are Categorical Exclusions (CEs), while 7 percent are Environmental Assessments (EAs), and only 2 percent are full Environmental Impact Statements (EISs). In addition, an FHWA survey of 89 projects requiring Environmental Impact Statements (EIS) for which 5 or more years has passed without a Record of Decision (ROD) found that the most common reason that projects were delayed was because of lack of funding or low priority (32 percent), local controversy (16 percent), or the inherent complexity of the project (13 percent). These findings suggest that beyond the environmental review process, there are a range of activities in planning, programming, and project development, which could also help to expedite needed projects.

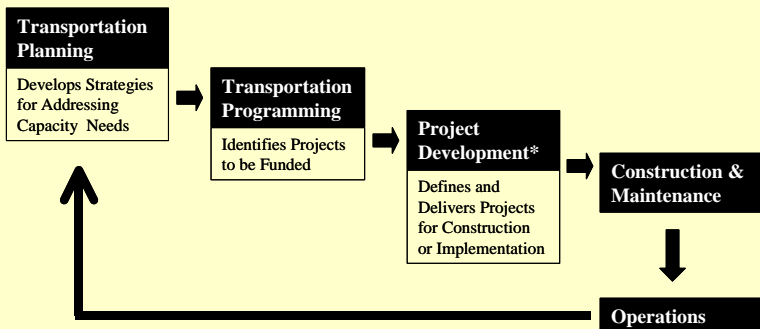
Box 2: Transportation Finance

Across the nation, government agencies and legislatures have created numerous ways to collect and distribute the funds that finance the transportation system. While some fund sources are available for a wide range of uses, some are tied to particular kinds of transportation improvements. These fund sources, and their governing rules, can sometimes create incentive structures that profoundly influence the kinds of transportation solutions that can be planned.

While a full discussion of transportation finance is beyond the scope of this report, the influence of transportation finance on transportation planning and the prospects for a more integrated approach should not be ignored.

In its simplest form, as shown in Exhibit 3, the current transportation decision-making processes involve planning, programming, and project planning and development. The project planning and development process involves steps including preliminary planning, development of alternatives, preliminary design and environmental review, final design and permitting, construction, and operations. The organizational format is logical, yet it can lead to suboptimal outcomes if viewed as a sequence in time and if communication is not maintained through the processes both internally and externally.

Exhibit 3: Elements of the Transportation Decision-Making Process



Specifically, there often is a major disconnect between surface transportation system planning and the project planning and development process. Within project planning and development, the current decision-making paradigm has grown out of the regulatory and analytical processes of the 1960s and 1970s, which segments economic, environmental, and transportation systems.¹⁴ Although the National Environmental Policy Act (NEPA) sets a framework for comprehensive consideration of potential effects on sensitive social and

¹³ AASHTO, 2000. Environmental Process Streamlining: A Report on Delays Associated with States' Categorical Exclusion and Environmental Assessment Processes, National Cooperative Highway Research Program (NCHRP) report 20-7 129, October 2000.

¹⁴ Draft Resource Paper, "Integrated Environmental Decision-Making." Transportation Research Board, Environmental Research Needs in Transportation, 2002.

environmental resources using an interdisciplinary approach, in practice environmental analysis and mitigation proposals are divided into categories—air, water, species and habitat, noise, community impacts—based on applicable laws and regulations. This focus on project level impacts and mitigation can be detrimental to looking regionally at the resources as systems that interconnect with each other and with the transportation system, and leads to mitigation which meets minimum regulatory requirements but focuses on micro-scale impacts and does little to enhance resource systems.

While values such as economic development, sustainability, and stewardship are generally identified by transportation agencies as goals and desired outcomes of the transportation decision-making process, they are not attained fully when a comprehensive and integrated analysis and decision-making framework is not deployed. These considerations need to be addressed early so that transportation decisions are made in a manner that considers the range of factors important to communities.













Given the importance of our transportation system to the economic well being of our nation and communities, it is critically important to create holistic decision making processes that are supported by the public. While the existing processes may have served us well during the development of works such as the Interstate Highway System, the challenges that we face currently and will face in the future require new approaches. To forge new approaches, the following fundamental challenges must be addressed.

- First, the planning process should more effectively account for transportation's interactions with the other systems that constitute our rural and metropolitan areas, including urban, economic, ecological, and other infrastructure systems. This will help us to better understand the role of transportation in meeting the goals and objectives that regions set for their social and physical development and to improve eventual outcomes. We should strive to plan and develop projects that meet the goals and objectives in forward-looking plans developed during the transportation system planning process.
- Second, the planning and programming processes should result in projects that best meet the mobility, accessibility, regional development, and environmental protection desires of communities. Simply stated, the decision-making process should provide solutions that are more responsive to the environmental, economic, and social goals of regions, that are delivered in a timelier manner, and that are more cost-effective.

To do this, we should encourage linkages between transportation system planning and transportation programming, project planning and development, land use planning, and environmental review and analysis. At first glance, these observations may come across as lofty, unattainable goals. However, as is discussed in Chapter 4 of this report, change is already underway; advances toward a more integrated approach to transportation decision-making are being made today by numerous state DOTs, MPOs, and local transportation agencies.

2.2 What is Integrated Planning?

Integrated transportation planning is about a collaborative, well-coordinated decision-making process that solves the mobility and accessibility needs of communities in a manner that optimizes across multiple community goals—from economic development and community livability to environmental protection and equity. It is about providing users of transportation systems with choices, and about providing information on the performance of transportation networks and facilities that reflects what customers value most (e.g., travel time reliability, environmental and community livability outcomes, and cost, among others). As depicted in Exhibit 4, integrated transportation planning is about a new way of doing business.

Exhibit 4: Integrated Transportation Planning Requires a New Way of Doing Business		
From...		To...
A focus on delivering transportation outputs		A focus on achieving multiple outcomes that are consistent with community goals
Making decisions that best meet the needs of this generation		Making decisions that also consider the needs of future generations
Implementing solutions that can perform well in a predicted future		Implementing solutions that can perform well in a range of possible futures
Planning a number of separate modal systems		Planning one interconnected transportation system that capitalizes on the strengths on each mode
An understanding of the effects of specific transportation modes		An understanding of the transportation system and how that system fits within broader human and natural systems
Separate planning based on who owns and operates infrastructure and services		Collaborative planning based on achieving sound system-wide outcomes
Recognizing how land use affects the way that the transportation system works (and vice versa)		Planning land use to help the transportation system achieve desired outcomes, choosing transportation projects and strategies that fit with land use plans and desired outcomes and avoid deleterious impacts where possible
Planning transportation and land use separately		Planning transportation and land use concurrently and iteratively
Focusing on mobility		Focusing on access to work and personal activities and goods and services
Responding to transportation demand		Influencing transportation demand and better analyzing actual demand, including induced demand
Supplying new transportation infrastructure and services		Making the best use of existing infrastructure and services first
Accepting or mitigating the negative effects of transportation on the natural environment		Seeking ways to conserve and enhance the natural environment
Adapted from: <i>Integrated Transport Planning Framework for Queensland</i> , Queensland Government, Queensland Transport-Main Roads.		

In essence, an integrated planning framework is characterized by the following elements (although in practice, there may be limitations on the applicability of integration concepts (see Box 3)):¹⁵

- **Integration with land use planning and across transportation modes and capacity enhancement options.** The transportation planning process can look more extensively at transportation options from a “transportation-as-a-system” perspective. Looking at transportation as a system requires a more careful and robust assessment of the various options available to planners and decision-makers for addressing accessibility, safety, and mobility needs. To do that, transportation professionals need a process like scenario planning that integrates transportation and land use and that guides consideration of alternative solutions, from operations to land use measures. Such broad alternatives should be considered individually and as ‘solutions packages’¹⁶. With regard to aviation planning specifically, a “transportation-as-a-system” perspective is important in so far as it relates to airport access and connectivity with surface access modes. Airport master planning does not require airport sponsors to consider alternatives to airport expansions not within their jurisdiction (although alternatives not under airport sponsor jurisdiction must be addressed under NEPA). Performance measures need to be constructed and used to develop integrated solutions (e.g., solutions that integrate improved facility operations and advanced technology into the delivery of new physical capacity).
- **Integration of the transportation system with other human and natural systems.** As part of the planning process, the manner in which transportation interacts with other systems, such as urban, economic, ecological, and other infrastructure, needs to be addressed in a more holistic fashion by using integrated institutional arrangements and more collaborative and better-coordinated decision-support processes. Alternative solutions packages identified in the initial steps of the planning process need to be evaluated in a systems-oriented fashion and prioritized accordingly. For instance, using new performance measures in this part of planning, strategies and projects would be screened for their environmental, social, and economic impacts in the given area or affected region. Fatal flaws would be identified, and only those projects that

Box 3: Planning Integration and the Federal Transportation Agencies

While integrated planning concepts can benefit decisions in all transportation modes, it is important to note that their application will necessarily be different across the federal agencies responsible for aviation, transit, and highway planning.

Although seamless, functional transportation systems, the use of GIS, resource agency and public input on large, complex projects, consideration of a full range of alternatives, and effective land use planning can benefit all modes, highway decision processes may have wider latitude than aviation and transit processes to apply integrated landscape-scale analysis and perspectives. These differences have their roots in the ties of aviation and transit planning to locations of existing airports and dense populations.

The intent of this report is not to change the statutory authorities of the modal transportation agencies, but rather to suggest additional ways in which the agencies can make decisions based on integrated planning.

¹⁵ Adapted from: *NCHRP 20-58(4): Interim Planning Activities for a Future Strategic Highway Research Program--Study 4, Capacity*, ICF Consulting, April 30, 2003.

¹⁶ "Solutions packages" conveys the development of multiple approaches to meeting transportation mobility and accessibility needs that when bundled together can best achieve environmental, economic, and social objectives.

meet agreed-upon evaluation criteria, prioritized in part based on environmental criteria, would move forward.¹⁷

- **Integration of transportation planning with transportation programming and project development.** The elements described above need to take place under an integrated institutional construct¹⁸ that allows for early, inclusive, and iterative collaboration across stakeholder groups. For example, appropriate mechanisms, such as leadership task forces or memoranda of understanding, need to be developed to promote cross-agency coordination (especially with local governments and MPOs) that enables stakeholders to work together to create plans and programs that optimize our ability to meet our social, environmental, and economic objectives—although with respect to aviation it should be noted that these mechanisms make sense only for complex, major airport planning projects (see Box 4). By creating plans that meet the prescribed social, environmental, and economic tests—as defined through integrated institutional processes—project delivery can be accelerated and the quality of projects can be improved. For example, NEPA processes at the project planning and development stage can then focus on the specific consequences of a particular surface transportation project that has already met ‘environmental feasibility’ criteria, given the environmental capacity constraints of the region. (Again, in aviation, except for tests of reasonableness and feasibility, cost, social, and environmental criteria are not applied to plans, rather only to alternatives during the environmental process.) Mitigation options can be focused, and opportunities for enhancing the natural and human environments can be identified. Integrated transportation system planning processes and project planning and development processes would help to ensure that the best possible projects are implemented in a timely manner, projects that best optimize across social, environmental, and economic goals.
- **Performance monitoring and evaluation.** Involving resource agencies during the earliest stages of transportation planning is necessary but not sufficient. The

Box 4: Integration For Small Planning Processes

The level of effort required for the planning integration activities described in this report is within the range for activities that are already undertaken for complex transportation projects and plans. However, there should also be recognition that this level of effort may not be appropriate for smaller planning processes that have smaller impacts and are already strained by resource constraints. For instance, there are thousands of small airports nationwide that retain very few staff and undertake plans and projects that do not have major off-site impacts. For these airports, extensive integration and public participation activities may not yield commensurate benefits. And in surface transportation, a similar consideration applies to mid-sized and smaller MPOs, as well as rural areas. These considerations concerning smaller planning processes should be front and center as recommendations are made for advancing the state of planning practice. The level of effort to integrate planning should be scaled to the complexity and proposed impacts of the planned projects.

¹⁷ While this type of integration is desirable in surface transportation, where planning occurs on a regular basis, in aviation the process is driven by airport master planning, which occurs every five to ten years or when airports are planning development with limited off-airport impacts. Because airport master planning is an airport-sponsor-driven process, FAA does not require that such planning eliminate alternatives based on cost, social, or environmental grounds unless the alternatives are determined to be unreasonable or unfeasible. Such considerations are applied to alternatives during the environmental process.

¹⁸ The term "integrated institutional construct" refers to the range of mechanisms that can be used to develop a collaborative and coordinated decision-making process that involves multiple organizations with vested interests in process outcomes.

implementation of integrated planning requires a significant cultural shift on the part of transportation and resource agencies. What currently can be contentious and adversarial interactions that focus narrowly on project-level effects can evolve to collaborative processes grounded on common goals and objectives and agreed-upon analytical approaches set at the earliest stages of decision-making. This evolution will require monitoring and accountability to ensure that commitments, made early in the decision-making process by transportation and resource agencies, are carried over into the projects that are implemented. Integrated planning requires effective and transparent monitoring of implemented solutions and by extension the development of relevant measures to project and then track the performance of transportation strategies, facilities, corridors, and networks. Monitoring also extends to any measures that transportation projects undertake to compensate for environmental effects.

A desired outcome of integrated planning is development of transportation projects that support, or at a minimum do not hinder, multiple community goals and objectives – transportation, social, and environmental. Expedited review of transportation projects will be another outcome, since integration would ensure a clearer understanding of the purpose of and need for projects and of the impacts of planned solutions before the project development phase. Projects with the potential for environmental effects of concern would be identified early and could be modified to meet the agreed upon evaluation criteria, and prioritized, at least in part based on environmental criteria. Integration also would ensure the development of environmental documents that are based on broader interagency agreements, resulting in a more efficient and expedited process.

Exhibit 5, on the next page, provides examples of the objectives and outcomes that characterize the core elements of an integrated transportation planning framework.

2.3 Primary Challenges to Integrated Planning

The surface transportation planning process is a detailed, Congressionally mandated procedure for developing long-range transportation plans and shorter-range transportation improvement programs. Federal regulatory requirements for transportation planning are codified in 23 CFR 450, with Metropolitan Transportation Planning addressed in Subpart C and Statewide Transportation Planning addressed in Subpart B.

Box 5: TEA-21 Planning Factors

1. Support the economic vitality of the metropolitan area, particularly by enhancing global competitiveness, productivity, and efficiency
2. Increase the safety and security of the transportation system for motorized and nonmotorized users
3. Increase the accessibility and mobility options available to people and freight
4. Protect and enhance the environment, promote energy conservation, and improve the quality of life
5. Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight
6. Promote efficient system management and operation
7. Emphasize the preservation of the existing system

Exhibit 5: Examples of Integrated Planning Objectives and Outcomes

Element	Objectives	Outcomes
<i>Integration with land use planning and across transportation modes and capacity enhancement options</i>	<ul style="list-style-type: none"> Develop integrated, multimodal solutions coordinating land use and transportation Integrate across capacity enhancement approaches Measure performance from customer and social perspectives 	<ul style="list-style-type: none"> A broad range of potential solutions, including operational/efficiency improvements, transit, walk/bike, land use, aviation and highway capacity, and demand management* are fully considered Transportation priorities are established to support broad visions for how we want our neighborhoods, towns, and regions to prosper
<i>Integration of the transportation system with other natural and human systems</i>	<ul style="list-style-type: none"> Recognize environmental constraints Improve the analysis of environmental impacts, especially those that are broader and less project-specific, and the integration of environmental goals into decisions Optimize across environmental, economic, social objectives Visualize footprints and broad impacts that are not ground-based and screen alternatives for fatal flaws 	<ul style="list-style-type: none"> Transportation and resource agencies work collaboratively to ensure that early consideration is given to equity, safety, mobility, accessibility, environmental, economic, fiscal, community, and land use goals The public is involved and engaged throughout the decision-making process in the development of goals, and in the implementation of solutions Development of solutions to transportation needs utilizes harmonizes and integrates economic, safety, mobility, social, and environmental objectives
<i>Integration of transportation planning with transportation programming and project development</i>	<ul style="list-style-type: none"> Select strategies via a systems-based approach supported by strong analysis Focus mitigation to achieve optimal balance across objectives Use context sensitive approaches for project design and delivery Accelerate NEPA review and the implementation of projects, reduce agency resource demands 	<ul style="list-style-type: none"> Strategies and project decisions are consistent with plans and satisfy commitments made in planning and project development Strategies and projects focus on environmental performance, community goals, and fiscal and economic performance, rather than on narrow impact mitigation The environmental review process is accelerated, and is based on clear and firm decision points that are aided by input from multiple stakeholders and that reduce project delivery delays The best technical, analytical, and policy skills are applied in all aspects of transportation project management (from planning to implementation), and project cost estimates and benefits are accurate
<i>Performance Monitoring and Evaluation</i>	<ul style="list-style-type: none"> Develop collaborative processes grounded on common goals and objectives Ensure that commitments are carried over into the projects that are implemented Use mutually agreed-upon performance measures to track the effects of implemented solutions 	<ul style="list-style-type: none"> A high level of trust characterizes interactions between transportation and resource agencies Commitments made early in the planning process help shape the design, development, and implementation of transportation projects Mitigation of unavoidable impacts is focused and decisions made in planning are seldom revisited, minimizing duplication of effort; mitigation is carried out and is successful or augmented Agencies are held accountable for their decisions, in part through reporting and rewards for good performance
* Note that demand management strategies are of limited application for aviation.		

The Transportation Equity Act for the 21st Century (TEA-21) identified seven specific planning factors that must be considered in the transportation planning process at both the metropolitan and statewide level (see Box 5, above). Although the TEA-21 legislation does not define these factors in detail, Planning Factors #1, #4, #5, and #7 explicitly set the basis for integrated transportation planning. Moreover, through the MPO certification process, the U.S. DOT considers whether these factors have been adequately assessed. Every three years, the Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) are required to jointly review and certify that Transportation Management Areas (metropolitan areas with populations greater than 200,000) are planning in accordance with TEA-21 and the Metropolitan Planning Regulations. The certification process is open to comment from other government agencies as well as from individuals and stakeholder organizations.

Protection of the environment is reinforced in the FHWA and FTA regulations clarifying the factors to be considered in the transportation planning process. Planning factors listed at 23 CFR 450.316(a) (13) indicate that MPOs must explicitly consider and analyze as appropriate, the “overall social, economic, energy and environmental effects of transportation decisions (including effects and impacts of the plan on the human, natural and man-made environment such as housing, employment and community development, consultation with appropriate resource and permit agencies to ensure early and continued coordination with environmental resource protection and management plans, and appropriate emphasis on transportation-related air quality problems in support of 23 U.S.C. 109(h)...”).

In addition, regulations at 23 CFR 771.101 and 105 implement the policies established under 23 U.S.C. 109(h), by stating that “alternative courses of action be evaluated and decisions be made in the best overall public interest based upon a balanced consideration of the need for safe and efficient transportation; of the social, economic, and environmental impacts of the proposed transportation improvement; and of national, State, and local environmental protection goals.” Improving consideration of these factors in metropolitan planning has the potential to enhance integrated planning, optimize environmental outcomes, and reduce conflicts and delays at the project level.

Aviation system planning is performed at several levels of government. The Federal Aviation Administration (FAA) maintains a five-year plan for the national aviation system. This plan, called the National Plan of Integrated Airport Systems (NPIAS), outlines the role of the public-use airports that are considered important components of the national air transportation system. Metropolitan, state, and multi-state aviation system planning fit between FAA’s national planning efforts and the more comprehensive master plans prepared for individual airports. Although federal law does not require aviation system planning, FAA encourages it by offering technical advice and financial support.¹⁹

FAA guidance for system planning encourages integrated planning. The guidance suggests that participants in the system planning process should include metropolitan and regional planning organizations, environmental agencies, and other transportation agencies. The guidance strongly favors intermodal planning and recommends an early

¹⁹ By statutory requirement, Federally-obligated airports must have a current Airport Layout Plan.

dialogue between aviation interests and surface transportation agencies to ensure that surface transportation improvements are coordinated with airport expansion plans. FAA guidance advises aviation planners be active participants in development of statewide and metropolitan transportation plans and in transportation improvement programs. To coordinate aviation system planning with local and regional land-use plans, FAA recommends including community land-use planners in a technical group during the system planning study.²⁰

An environmental document is not normally required for multi-state, state, or metropolitan area system plans. In most cases, the airport system plan will not inventory environmental features to the degree necessary to make decisions on viable planning alternatives or to scope an environmental document. However, FAA advises that a system plan should consider obvious and known environmental features, such as the presence of significant residential development, parklands, wildlife preserves or known historic resources. Based on this preliminary environmental inventory, planners should be able to identify environmental factors that would be important in defining viable airport roles and reasonable development alternatives.

Consequently, it is clear that the spirit of the laws and regulations that govern surface and transportation and aviation systems planning, programming, and project development are consistent with the objectives and desired outcomes of integrated planning frameworks. Yet, although current laws and regulations do not present barriers to integrated planning, and actually support the development of an integrated decision-making process, a number of important challenges still surface. For example, and in addition to the issues associated with transportation systems planning discussed above, there are a number of other challenges that must be overcome.

- **Agencies are unaware of the planning outputs of other agencies.** While substantial interaction between agencies occurs during transportation project planning and development reviews, agencies generally are unfamiliar with the advance planning work that supports these project implementation and review activities. In the case of resource planning, such planning work currently does not produce comprehensive landscape-scale sets of useable resource information. Moreover, what information does exist generally has not been shared with transportation agencies. Similarly, transportation system planning outputs sometimes lack enough project information for resource agencies to make preliminary determinations of the potential effects of the projects being evaluated. Partially for this reason, and partially because of staffing and cultural constraints, transportation plans generally are not developed in association with the resource agencies that will eventually become responsible for reviewing proposed projects emerging from those plans. This relegates any potential points of conflict among agencies to the project planning and development stage, where dispute resolution is costlier and more difficult, and solutions are likely to be less effective for environmental protection.
- **Mechanisms and legal frameworks to engage resource agencies early in transportation systems planning are generally lacking.** With some exceptions, as

²⁰ FAA Draft Order 50XX, The Airport System Planning Process, May 13, 2004, <http://www.faa.gov/ARP/publications/acs/draft/SysPlan/50xx.htm>

in Washington, Florida, and some localities, resource agencies typically are not engaged before transportation projects enter the NEPA process associated with the project planning and development stage. Resource agencies often do not understand the transportation planning process or the relationship between state and local transportation planning agencies and the Federal Highway Administration. State and local planning bodies and transportation agencies rarely invite resource agencies into the planning process and resource agencies do not know how to effectively engage in the planning process when they are invited. No requirements or guidance have been given regarding how these agencies are to be involved in transportation systems planning activities other than in transportation conformity. As a result, agencies are unsure how to interact with each other and with the state and local agencies in the transportation system planning stage or transportation programming stage. Furthermore, few mechanisms exist to support such interaction even when it is initiated. For both transportation and resource agencies, this uncertainty translates into risk, raising fears of derailed planning processes and ineffectual use of staff resources. Without guidance or strong and inspiring leadership, agencies are unlikely to move away from the traditional project planning and development review model of interaction.

- **Agencies are constrained by available resources.** All agencies are constrained by available resources, but resource agencies are particularly affected by staffing constraints, as their workloads are not solely dictated internally, but also by the work and schedules of external agencies. Resource agencies are compelled to strike a balance between fulfilling procedural responsibilities associated with project planning and development reviews and conducting broader planning activities to support integration and conservation. Because project delays so readily translate to cost increases, and because transportation projects are often high-profile public investments, political pressure to expedite project delivery looms large over resource agency activities and places high demands on staff resources. This pressure acts as a major deterrent to shifts of such resources to focus on integrated planning at the transportation systems planning stage if such shifts result in corresponding movements away from project planning and development review functions.
- **Resource agency structures and cultures do not actively support involvement in integrated planning processes.** Each agency views and administers laws relative to its mission. Different procedural requirements, different languages rooted in technical and bureaucratic functions, and differences in scales or scopes of operation represent some of the logistical differences that need to be reconciled among agencies. Sustained participation in integrated planning and project development processes may necessitate consolidation of expertise and re-arrangements of staff resources.

Resource agency cultures are also not currently supportive of staff involvement in transportation systems planning activities. For instance, agencies tend to focus on how much environmental impact can be avoided during project reviews, but that focus does not account for plans, strategies, or transportation projects that avoid impacts in the first place, creating an incentive to target staff resources at the project level, especially in light of limited available staffing and statutory requirements for project reviews. Even if this incentive is not explicitly institutionalized, it does serve

as an impediment to more extensive resource agency involvement in transportation planning.

Furthermore, a trust perception issue exists between resource and transportation agencies. Resource agencies perceive expenditure of staff resources on planning processes as major risks. Resource agencies are hesitant to trust that input given during a transportation system planning process will be utilized, and that involvement in such processes will eventually yield transportation projects that are better from an environmental resource perspective than if the agency were not involved at all.

➤ **Societal state of knowledge of ecosystem function and relationships is limited.**

Scientific understanding of ecological characteristics and relationships, such as structure, function and change, are limited. This understanding is necessary to adequately identify and address impacts to individual resources and the ecological processes necessary to sustain them.

Even if agencies shared the same mission and values and operated under joint procedures using similar spatial and temporal scales, there is a limited understanding of how ecosystems function, the role each component plays and how these roles change as the quality and quantity of these components vary across the landscape. While physical properties are easy to quantify with greater precision, biological components (or living organisms) adapt and populations increase and decrease which causes a ripple of effects in foreseeable and unforeseeable changes in the environment that complicate the analysis critical to environmental reviews. Despite this fact, there is a growing body of research to aid in understanding the impacts of transportation projects on biological species and ecosystems.

➤ **Local land use is sensitive to fiscal, economic, and political constraints.** The success of transportation and resource planning processes hinge on land use decisions. The reverse is also true. However, in metropolitan areas, land planning is a local function, with decision processes driven by city and county concerns. Here, several constraints work to hinder local land planning processes from holistically incorporating transportation and environmental concerns on a regional basis. First, the tax structures that finance local governments often create fiscal reliance on additional land development (especially for high-revenue businesses) and competition among localities for tax dollars. Second, while economic vitality, environmental protection and conservation, and the public health are goals of planning processes, the interactions between local economies, land development, and transportation infrastructure remain difficult to quantify, acting as a constraint to exploring alternative land use and transportation strategies.²¹ And lastly, localities are particularly sensitive to preserving home rule, possibly leading them to equate any federal involvement in land planning processes as attempts to usurp local control. Efforts to evolve local land planning to better support an integrated approach will require effective partnerships with local governments and sensitivity to their areas of authority in land use planning.

²¹ New tools such as SGI Places, CommunityViz, PLACE³S and others are available to model these impacts.

3. Resolving Challenges: Capitalizing On Existing Opportunities

The strategies for accomplishing the desired objectives and outcomes presented in Exhibit 5, and for overcoming challenges such as those discussed above, would vary necessarily from one community to another. However, as a first step, this baseline development effort has identified general strategies for more integrated processes. It should also be noted that development and implementation of the strategies identified in this Chapter must be grounded on relevant and accurate performance measures and strong connections with local land use planning. Progress in these two fundamental areas is critical to taking an integrated approach. The general strategies identified are as follow:

1. **Use each other's planning outputs.** As discussed in Chapter 2, there is a general lack of knowledge on the part of both transportation and resource agencies about the processes, methods, and outputs that comprise transportation, resource, and land use planning. Transportation agencies generally are not aware of how specific resource planning processes unfold, the types of methods that are used by resource agencies, and the outputs that are generated. Likewise, with a partial exception at EPA, resource agencies generally are not sufficiently knowledgeable of transportation planning processes and the regulations that govern them to engage most effectively.

In order to ensure a more collaborative process and to provide the basis for early consideration of the effects of alternative transportation solutions on environmental, community, and cultural resources, it is imperative that transportation agencies increase their fundamental understanding of resource planning processes. It is also crucial that resource agencies understand how they can participate in, and contribute to, the development of transportation plans and programs, and that opportunities are created for them to do so. The commitment of both transportation and resource agency leaders to an integrated planning framework is critical to gaining the cross communication and understanding needed to further the work of developing integrated plans.

2. **Develop innovative institutional mechanisms.** There is a multitude of federal, state, and local government agencies that have a stake in the outcomes of transportation plans, programs, and projects. Integrated planning requires collaboration across agencies. Strong and effective leaders that have the achievement of community goals and objectives as their number one mission must forge that collaboration.

One example of an innovative institutional mechanism is the development of executive task forces comprised of leaders from the various interested agencies and whose mandate is to, in collaboration with implementing staff, forge a vision for an integrated decision-making process. It is imperative that the vision for integrated planning come from the top, and that those responsible for crafting goals and objectives can hold accountable those responsible for implementing strategies.

3. **Take advantage of state-of-the-art technology.** A range of tools, including Geographic Information Systems (GIS) and Remote Sensing, can be used to replace manual collection and integration of some of traffic, environmental, and community

data. These tools are capable of assembling, storing, manipulating, displaying, and sharing geographically referenced information and allow for integration of some transportation, social, economic, and environmental data as a means to take an integrated perspective in developing plans, programs, and projects.

Decision support systems that computerize program and project management work and guide users through review and documentation processes could help to simplify the environmental process and ensure that all considerations are taken into effect.

There are a number of states that are in the process of deploying advanced information systems to

improve the transportation decision-making process. The most innovative of these are bringing together information available from resource agencies on sensitive habitats, endangered species, cultural resources, watersheds, and the like to ensure a more integrated approach to transportation planning. It is evident from such efforts that integrated transportation planning will rely on advanced information systems that are available today (see Box 6).

**Box 6: Research Efforts on Remote Sensing and GIS
Transportation Applications**

The *DOT-NASA Joint Program on Remote Sensing and Spatial Information Technologies* is at the forefront of research on developing and applying advanced technologies. In April 2002, it published a report, "Achievements of the DOT-NASA Joint Program on Remote Sensing and Spatial Information Technologies: Application to Multimodal Transportation" which summarizes an array of available data collection technologies for which transportation applications have been identified. The Transportation Research Board (TRB) and FHWA's Travel Model Improvement Program (TMIP) have also examined the potential for remote sensing and GIS for transportation applications, and serve as a basis for further research. In 2000, TRB held a conference on Remote Sensing for Transportation. TMIP issued a report, "GIS in Transportation, Transportation Case Studies," which examined the use of GIS by the various MPOs and state DOTs.

- 4. Ensure an effective and transparent decision-making process.** Aspects of decision-making include planning processes and requirements; the institutional relationships behind them; access to the information outputs from all involved agencies (transportation and resource agencies alike); and the analytical tools, performance measurement, and public involvement that support them. These aspects are important for addressing the complex and sometimes contradictory social, economic, mobility, and environmental goals expressed by communities. Added to this complexity is the number of agencies involved in the transportation decision-making process, and the diverse mandates and functions that determine their activities in response to community goals. These conditions complicate the task of developing transportation solutions that reflect the full demands of customers (i.e., high-quality transportation facilities and networks, as well as high-quality environmental stewardship), highlighting the need for an effective and transparent decision-making process. And because land use is such an integral component of the overall human and ecological system, any integrated planning effort will need to include strong linkages with local land planning processes in addition to transportation and resource linkages in order to ensure an effective, comprehensive planning and decision-making process.

The outcomes of effective decision-making processes are project decisions that make use of all appropriate modal, land use, or technology options to provide timely and

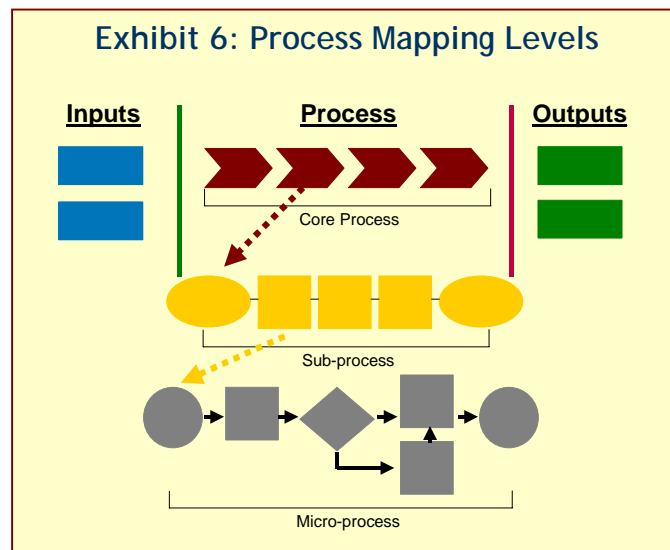
workable transportation solutions, which optimize across multiple objectives including social equity, economic development, fiscal responsibility, mobility, safety, accessibility, environmental quality, and community quality of life. Ensuring that 1) there are multiple points of coordination amongst the multitude of agencies that affect the process, 2) commitments made early—at the planning stages—are sustained throughout the process into project design, development, implementation, and operation, and 3) planning results can support strong, specific, realistic, well-connected purpose and need statements and impact assessments, is critical to achieving a seamless overall process.

This Chapter discusses the strategies listed above. To set the background for the strategies, it first offers observations on the processes and needed progressions for transportation and resource planning, drawing on the literature review and analyses, targeted interviews with transportation and resource agency staff across the nation, and process mapping exercises that were conducted as part of Integrated Planning Work Group's baseline development activities.

3.1 **Brief Overview of Transportation and Resource Planning**

A significant portion of the baselining effort was dedicated to understanding the planning processes used by transportation and resource agencies. Core process mapping activities were carried out for the three modes of transportation, as well as the five planning disciplines identified in Chapter 1 that are the subject of this report. Those maps enumerate the high-level, conceptual steps that are taken for core planning activities. Within core processes there exist sub-processes for many of the high-level steps, and each planning process produces outputs that could serve as the basis for a more integrated decision-making approach. Exhibit 6 depicts the process mapping levels.

The process mapping exercise was conducted to better understand existing integration opportunities. It uncovered some notable insights. First, the level of detail varies significantly among planning processes; in some cases, procedures are unspecified to the extent that attempting to map the process in detail might be construed as making new guidance. Second, there are points along these planning processes that represent important integration opportunities. However, the effort found that more specific insights about the precise points of coordination within processes and the exact nature of these integration opportunities would require refining the core process maps and conducting an in-depth mapping exercise beyond the scope of the IP WG's baselining task. But such an exercise could yield valuable information about the potential for integration; a recommendation of this report, therefore, is to conduct such an exercise to refine the core process maps, as well as to develop in-depth sub-process maps in



coordination with future federal integration activities. The work produced by the baselining activities can be made available as a starting point.

In addition, the mapping exercise identified key outputs from specific resource planning activities that can be integrated into transportation planning. Prior to discussing those outputs, the following sub-sections briefly describe the transportation and resource planning processes.

3.1.1 Transportation Planning

Highways and Transit

Surface transportation planning (highways and transit) takes place at the state, regional, and local levels. The scope and nature of the process differs based on the area being covered and requirements set out in laws and regulations.

Metropolitan planning organizations (MPOs) are required to develop transportation plans for urbanized areas with a population greater than 50,000. The main responsibility of the MPO is to serve as a regional agency coordinating transportation planning and programming among state and local jurisdictions and agencies. The process is designed to foster involvement by all interested parties, such as the business community, environmental organizations, community groups, and the general public. This is meant to be accomplished through a public participation process conducted by the MPO in coordination with the State DOT and transit operators. The planning process is designed to include a number of activities:

- Developing consensus on a regional vision and goals;
- Forecasting future conditions, including population, employment, and land uses in the region;
- Identifying major growth corridors and analyzing, through detailed planning studies, various transportation needs;
- Developing alternative infrastructure and operating strategies for improving the system;
- Estimating the impact of the transportation system on air quality within the region;
- Examining decisions in the context of environmental justice, land use plans, economic development, and other goals;
- Developing a financial plan that covers operating costs, maintenance of the system, system preservation costs, and new capital investments; and
- Developing a public involvement plan that engages the communities and public throughout the transportation decision-making process.

Several planning documents are prepared by the MPO:

- The *Long-Range Transportation Plan (LRTP)* looks broadly at transportation in the region and sets goals for the future, and is required to plan for a period of at least 20

years. The LRTP is supposed to be updated every three to five years (depending on whether the region is in non-attainment for air quality standards). The Plan makes estimates of future infrastructure needs and identifies the investments that should be made, given available funding.

- The *Transportation Improvement Program (TIP)* is a financially constrained short-term program covering the most immediate implementation priorities for transportation projects and strategies from the LRTP. The TIP must cover a minimum three-year period of investment and be updated at least every two years to reflect the current funding situation. While federal regulations require the TIP to include all projects receiving any federal funds, some regions include all projects in the TIP, even those being funded only with state and local funds. In areas subject to transportation conformity, regionally significant projects²² must be included, regardless of funding source.
- Some MPOs also conduct corridor and sub-area studies, which take a corridor-wide perspective in developing a package of specific projects, and which can be conducted under an approach that utilizes tiered environmental documents. The tiered environmental approach was designated as IP WG's Priority 3, and will be investigated in activities related to that priority.
- The *Unified Planning Work Program (UPWP)* specifies tasks to be performed by the MPO staff or member agencies. The UPWP format varies significantly from region to region. Typical elements include a list of planning tasks and studies that will be conducted over a one- to two-year period, an implementation schedule, an identification of which agencies are responsible for each task or study, and identification of funding sources.

Together, these documents lay out the major highway and transit investments and programs that will be implemented within a region by state DOTs, transit agencies, and local agencies.

Airports

Airport planning in the U.S. is performed at several levels.

1. At the federal level, the National Plan of Integrated Airport Systems (NPIAS) is a published five-year plan that is developed by FAA. The NPIAS lists the public use airports and their developments considered to be in the national interest and eligible for financial assistance under the Airport and Airway Improvement Act of 1982.
2. Statewide airport system planning identifies the general location and characteristics of new and existing airports and the general expansion needs of existing airports to meet statewide goals. State transportation or aviation planning agencies develop these

²² Regionally significant project means a transportation project (other than an exempt project) that is on a facility which serves regional transportation needs (such as access to and from the area outside of the region; major activity centers in the region, major planned developments such as new retail malls, sports complexes, etc., or transportation terminals as well as most terminals themselves) and would normally be included in the modeling of a metropolitan area's transportation network, including at a minimum all principal arterial highways and all fixed guideway transit facilities that offer an alternative to regional highway travel. (Source: 40 CFR 93.101)

plans with input from regional and local entities.

3. Regional metropolitan airport systems plans identify airport needs for large metropolitan areas, and are prepared by regional/metropolitan area planning agencies. Needs are stated in general terms and incorporated into statewide system plans. MPOs develop these plans with input from local entities (i.e. airport sponsors).
4. The operators of individual airports prepare airport master plans that specify the needs of specific airports. The purpose of an airport master plan is to set out a plan for future development designed to meet projected needs given community, environmental, and political considerations.²³ It is at this level of airport planning that NEPA requirements arise and the need for integrated planning frameworks is most pressing.

An airport master plan is a detailed, long-term development plan for an individual airport. It is prepared to support the creation of a new airport or the modernization or expansion of an existing airport. Typically, operators of individual airports prepare airport master plans and participants in the planning process include airport management, Federal Aviation Administration (FAA) officials, state aviation organizations (such as state DOTs), representatives of the aviation industry, the public, and consultants.²⁴ The goal of an airport master plan is to outline airport development that will satisfy future aviation demand in a financially feasible manner, while also addressing the environmental and socioeconomic concerns of the community.²⁵

An airport's master plan should reflect the role envisioned for the airport in a state or regional airport system plan and linkage to the surface transportation system, and in some areas there is area wide planning for airports. These plans are in turn reflected in FAA's NPIAS. Inclusion of airports in the NPIAS establishes eligibility for federal financial assistance under the Airport Improvement Program (AIP).

The major steps in the development of an airport master plan are as follows.

- **Organization and Pre-Planning.** For more complex planning efforts, the airport operator may establish formal policy, technical, and review committees, as well as a schedule for public meetings and information sessions. The airport operator determines the proper scope of the planning effort by reviewing the issues facing the airport and making a preliminary assessment of what it will take to resolve each of these issues. FAA recommends that this step include an attempt to identify the required environmental documentation for the development that is likely to be recommended.

²³ *Land Use Compatibility and Airports*, <http://www.aee.faa.gov/noise/aee100files/LUPItoolkit/iii.b.pdf>

²⁴ In some cases, state aviation agencies may prepare airport master plans for multiple general-aviation facilities under one system planning grant from the FAA's Airport Improvement Program (AIP).

²⁵ The FAA does not approve the content of an airport master plan except for aviation forecasts. If the plan is developed with federal grant funding, the FAA will ensure that the work elements specified in the grant agreement have been completed. A major product of the master planning process is an airport layout plan (ALP), and the FAA will not approve a grant for airport development unless the airport operator has an up-to-date and approved ALP. In order for FAA to unconditionally approve an ALP, the appropriate NEPA process must be completed as described in FAA's Airport Environmental Handbook (Order 5050.4).

- **Inventory and Forecasts.** Development of an inventory involves collecting data on existing conditions and issues facing the airport. In addition to the inventory, the planners also produce forecasts of the different elements of aviation demand and compare that demand over time with the capacity of the airport's facilities. This comparison will indicate the time when new or expanded airport facilities may be needed.
- **Requirements Analysis and Concepts Development.** Given the inventory of current infrastructure and forecasts of future demand, the planners determine whether the airport can accommodate the forecasted demand. Preliminary environmental and financial assessments are conducted to identify any possible constraints that would limit the airport's future expansion. If the assessment of the airport's capacity shows a demand for substantial expansion, the planners investigate alternative methods of meeting the demand, including the alternatives of doing nothing or transferring traffic to another airport.
- **Further Steps for Expansion of an Existing Airport.** If planners determine that demand can be accommodated at the existing airport, they synthesize landside and airside concepts and revise the Airport Layout Plan (ALP) and landside plans for the terminal areas and surface access routes. FAA reviews the planned developments in the ALP with respect to safety, efficiency, utility, and environmental impact. FAA approval of an airport's ALP is a precondition for federal financial assistance for further work on the planned development. Unconditional approval of an ALP is contingent upon first having a satisfactory NEPA determination (i.e. CAT EX, FONSI, EIS/ROD).

Needed Progressions in Transportation Planning

Transportation planning as a practice has been making some strides to produce the outcomes discussed in Chapter 2, but still falls short on delivering such outcomes to the fullest potential. Some current planning needs stand out as ones that could be met with greater integration, as well as ones that must be resolved before integrated planning can be embraced.

- **Transportation planning processes are struggling to achieve a "transportation-as-a-system" perspective.** A

holistic approach to improving the transportation system has yet to take hold in common transportation planning practice. First, transportation agencies struggle to bridge disconnects even within the process for transportation planning, programming, and project development. Attaining consistency among these activities would make

Box 7: Massport and Boston MPO Coordination

The Massachusetts Port Authority (Massport) has achieved success in coordinated planning among aviation, highway, and transit agencies. Massport manages several airports in the Boston area, including Logan International Airport, which was being strained by high airside demand. Massport used its representation within the Boston MPO, and worked with transit and highway agencies in Rhode Island and New Hampshire, to develop solutions for Logan's capacity constraints. With the aim at reducing airside demand there, Massport collaborated with the Massachusetts State Transit Authority, and the Boston MPO to plan for train service from Logan to the nearby T.F. Green State Airport in Providence, Rhode Island, and the widening of Route 3 from Boston to Manchester Airport in New Hampshire.

This multimodal planning was made possible in part by FAA efforts to ensure that NEPA reviews for airport improvements include alternatives based on system-level analysis and planning. Massport's participation in Boston MPO infrastructure planning processes also facilitated this success in system-level planning.

strides toward robust transportation decision-making processes that could then serve as a basis for linkages with environmental and community goals. Second, there continues to be a need to integrate across transportation modes (see Box 7, above). While travel needs of people can be fulfilled via multiple modes, transportation planning and project financing have historically favored single-occupancy vehicle travel over other modes, such as transit, bicycling, or walking. Alternative means of meeting the broad range of transportation needs should also be examined at the systems level. Likewise, a systems perspective in freight transportation is hampered by significant differences between the roles of the private sector in the provision of needed capital investments. For example, freight rail investments are the responsibility of the private sector, whereas government largely is responsible for the provision of needed highway facilities. Decision-making processes that are best suited to incorporate a holistic set of community and business concerns are those that are able to utilize all available alternative strategies. Third, transportation can also fundamentally utilize non-infrastructure means to address capacity needs. A more proactive approach to operations can improve travel time reliability and provide greater mobility without infrastructure capacity increases. In the case of surface transportation, a demand management approach also can address societal needs through means other than infrastructure improvements. Although progress is being made, this system perspective is hampered by current institutional and political conditions. There are also places within the planning processes themselves that could more actively support a system perspective.

- **Institutional and political conditions are difficult to navigate.** Transportation planning, construction, and operations functions have been compartmentalized into disparate local and state agencies, making it difficult for multiple decision-makers to form plans, programs, and projects that are optimal for the system as a whole. Political considerations can also work against a system perspective, sometimes driving the process toward large new infrastructure investments in order to bring the economic benefits of federal investment to local communities. And lastly, the processes for financing the transportation system are exceedingly complex, including multiple local, state, and federal fund sources, each of which retains a set of eligibility restrictions for the kinds of transportation improvements that can receive funding. Progress is being made in building in more flexibility into federal funding mechanisms, but the focus is still on new infrastructure.
- **Public participation processes are not well-developed.** Visioning components that incorporate extensive public input are not yet commonplace in transportation planning practices. While some agencies have experimented with new technologies that help to capture public input, further progress is still needed. FHWA's Planning Assistant tool and Scenario Planning concept are techniques to consider a wide range of issues in developing a long range plan.
- **Performance measures are not consistently applied.** A similar evolution is occurring to increase the consistency with which system-wide performance measures are applied. While federal requirements exist for transportation planning procedures, they do not stipulate any specific standards to which the systems created by such plans are required to perform, nor require that any standards be employed. Some

performance measures are currently employed for managing specific transportation facilities, but consistent application of measures for transportation system performance is not yet commonplace.

- **Modeling and other analysis tools continue to warrant refinements.** Vast improvements have been made since the advent of computer modeling, but continual and further advancements are needed to help communities and agencies better understand the interactions between land use, transportation demand, transportation capacity, and environmental systems.
- **Transportation planning processes are struggling to more proactively optimize across environmental, social, and economic objectives.** This challenge is caused in part by a major disconnect with land use planning. Growth pressures inextricably link transportation with land use, but planning for each occurs separately from the other. Local land use decisions have vast implications for environmental, social, and economic objectives. Transportation decisions that incorporate future land use as an input, rather than as a concurrent parameter, are more difficult to optimize across these objectives. There is a need for an improved integration mechanism between land use plans and other planning decisions. Federal agencies can assist in creating integration and feedback loops through education, provision of tools, facilitation and improved communication. That way, local governments making land use decisions are aware of the full array of options available to analyze various scenarios and are better informed of the consequences of their land use decisions on the natural and built environment.

The timing of environmental considerations within transportation decision-making processes also contributes to this challenge. Transportation agencies usually interact with resource agencies at the project development stage, at which point substantial environmental analysis and expertise is brought to the evaluation of transportation projects. But, by that point the range of transportation options has been narrowed down, and significant amounts of technical work and consensus-building have been invested into projects, making transportation agencies reticent to dialogue about potential major changes²⁶. The laws enacted to foster coordination between transportation and resource agencies have focused on inter-agency interactions only when projects are ready for implementation, giving resource agencies authority for consultations and permits on projects, rather than plans. As a result, transportation planning processes are often conducted without the benefit of comprehensive natural and cultural resource information.

3.1.2 Environmental Resource Planning

Because of the close interactions between human and environmental systems, resource planning has generally targeted changes in planned human activities to produce better environmental outcomes. Resource planning has taken shape against this backdrop, featuring authorizing statutes and mechanisms that enable resource agencies to give input

²⁶ Note that in aviation planning, the draft FAA guidance “Consideration of Environmental Factors in Airport Master Planning” emphasizes that only those alternatives that do not meet the planning need, are unreasonable, or are infeasible, are eliminated during planning.

to the processes used to prepare projects for implementation, including transportation projects, with the aim of avoiding, minimizing, or mitigating their impacts on environmental resources. Some advance resource planning has been conducted to determine baseline information such as maximum acceptable levels of pollution, the biological aspects of the most important fish and wildlife resources to conserve, or which properties constitute important cultural resources.

Most of this work has been focused on preparing resource agencies to most effectively give input about natural and cultural resources at the project implementation stage. In rare cases, the federal government has actively participated in conservation activities, such as the development of conservation assessments for trust species such as migratory birds or endangered species, or acquisition of important habitat lands for wildlife refuges. And in other cases, such as in air quality, resource agencies have been able to link air quality goals to planning-level transportation activities. However, it is generally the case that the work to establish conservation priorities on a regional basis, including the compilation of comprehensive resource inventories, is yet to be accomplished. As a result, resource planning generally takes a reactive stance to proposed projects, involving extensive coordination with action agencies at the project development stage.

The planning processes of interest, first identified in Chapter 1, are as follow:

- Air Quality Planning,
- Cultural Resources/Traditional Cultural Properties (TCPs) Planning,
- Endangered Species/Migratory Birds Conservation Planning,
- Land Use/Land Management Planning, and
- Watershed Planning.

Section 3.4, below, discusses the outputs that are generated by each of these planning efforts, and how those outputs can be used to forge a more integrated approach to transportation planning. In doing so, that Section refers to many of the elements that define a given resource planning exercise.

Box 8: Institutional Coordination Challenges are Many

Taking a broad view, an integrated, systems approach to transportation decision-making should involve other organizations including for example, land developers and land use authorities, energy and water utilities, and others whose decisions affect the development of our urban and rural areas. In California alone, for example, there are more than 7,000 units of local government (with 15,000 elected officials) influencing the state's development. Across the country, because many of the institutions involved in decisions that either directly or indirectly affect the development of a region have independent authority, effectively coordinating decisions to improve transportation projects (or ensure that they achieve desired outcomes) is incredibly challenging.

Traditionally, the manner in which transportation organizations have approached decision-making has been to predict the effects of transportation decisions in a deterministic manner (e.g., building a highway will improve mobility from point *a* to point *b* and, by extension, improvements in mobility will enhance the economy and improve the quality of life of the affected people). Transportation agencies at all levels have been organized around this deterministic construct. Yet this construct does not reflect the complex, self-organization, and adaptive nature of how the systems that affect the development of regions interact.

Adapted from: Innes, Judith and Booher, David, *Metropolitan Development as a Complex System. A New Approach to Sustainability*, Economic Development Quarterly, Vol.13, No.2, May 1999.

Needed Progressions in Resource Planning

For transportation decision-making processes to fully capitalize on existing opportunities to more effectively incorporate social, economic, and environmental considerations,

evolutions are needed to move forward the state of resource planning practice. A summary of needed progressions in resources planning is provided below.

- **More emphasis on regional scale resource analysis and protection.** Current resource conservation processes tend to focus on site-specific needs, but this approach creates incomplete knowledge about the most critical resources in a particular geographic area. It is also much less effective than addressing problems at the regional level, where many of the important decisions occur, and where some environmental problems manifest themselves and are most easily addressed. The result is difficulty in prioritizing conservation efforts to better accommodate needed transportation investments, and difficulty in finding environmentally protective options. Landscape-scale analysis would help to inform the areas of most critical concern for natural and cultural resources, informing a prioritization of resources to the most critical issues, locations, and transportation projects. Such analysis also would prepare resource agencies to become engaged more proactively in effective dialogues about system-wide alternative transportation strategies.
- **More comprehensive resource inventories.** The current lack of a landscape-scale, regional perspective also results in incomplete inventories of natural and cultural resources. Some inventories do exist, but may be incomplete, exist in non-digital formats, and contain information too sensitive to share in the public domain. Incomplete environmental information affects the ability to plan conservation and provide needed outputs for integrated plans. A single, comprehensive source for environmental information capable of being shared and updated among numerous agencies could serve as the cornerstone of integrated planning processes, informing discussions about interactions between human and environmental systems.
- **More environmental considerations in local land planning.** Local land planning can be a major component to integrated planning. In some states and some localities, current practice in land planning focuses much of its attention on strategies for economic growth through land development. Land use decision processes that more holistically incorporate natural and cultural resource goals and information can better optimize across multiple objectives, enabling the land planning process to serve as the basis for integrated planning. Just as important is a regional approach to land planning. Land use authority is fragmented into multiple jurisdictions, but growth impacts occur on a regional basis, requiring a collective response among many localities (see Box 7, above).

3.2 Taking Advantage of Relevant Resource Process Outputs

As the beginning of this Chapter notes, the first strategy for improving integration involves increasing the familiarity of agencies with each other's work. As shown in the preceding sections, some needs in transportation planning stem partially from insufficient information about cultural and natural resources and the effects of transportation on those resources. Some of these needs could be addressed by expanding the inputs of transportation planning to include outputs from resource planning processes. Although the previous section has shown that resource processes could be improved, they nonetheless could infuse transportation processes with important information. Two

general types of outputs from environmental resource planning are potentially useful in transportation planning.

- The first is the collection of outputs from the project environmental review and permitting process, which serve as the basis for permitting, determinations, and other environmental clearances. These outputs take a site-specific analysis perspective, and may not by themselves provide a complete picture of natural and cultural resource information on a landscape, or regional, scale. Where these outputs are already in a data format where they can be easily retrieved, they can be collected over a number of previous projects, and work could be done to produce similar analysis on a more landscape-scale basis, to construct a picture of the natural and cultural resource landscape that could be useful in informing integrated transportation system planning processes. More importantly, for projects which are about to begin the environmental review process, data outputs could be specified to be produced in a format which would allow for collection and integration with other data bases.
- The second is the collection of outputs produced by the planning activities of resource agencies. Such activities are less common than project review products, because of the reasons discussed above in relation to resource agency authority and responsibilities. But some resource outputs do exist and stand as potential inputs to the transportation decision-making process. Additional efforts could also be invested to strengthen the kinds of resource planning outputs that are available for inclusion in transportation planning.

These products are useful along two dimensions: 1) for identifying locations of environmental or cultural sensitivity; and 2) for describing the nature of interactions between transportation and other systems. Data on locations of environmental sensitivity can be infused throughout the transportation decision-making process, from setting environmental capacity constraints to serving as the basis for developing alternative improvement strategies, describing the footprint of alternative strategies, and influencing the selection of preferred strategies. Descriptions of the nature of transportation interactions are also useful in developing alternative strategies that are more sensitive to natural and cultural resource needs, and ensuring that any selected strategies incorporate environmental design features to the extent possible.

One resource planning process is particularly critical in strengthening the linkages among resource and transportation planning. As discussed before, land use serves as the foundation upon which transportation and environmental resource concerns can be addressed, because it is here that economic growth and development goals interact most closely with transportation and resource conservation goals. Therefore, local land planning is a key process to address if integrated planning efforts are to bear fruit. Benefits can still be realized through better integration even in the absence of integration with land use planning, but many of the biggest pay-offs to integrated planning hinge on the ability to integrate with land use plans and decisions.

While most current resource and transportation agency coordination activities are focused on reviews and consultations at the project level, one resource planning process has already achieved a degree of integration with transportation at the system level. The air

quality and transportation integration experience stands as this exception. Prompted by explicit legislative requirements toward advancements in interagency coordination, improvements of analysis tools, approval criteria, and evolutions in transportation project development processes, transportation/air quality planning serves as a model on which to base further integration efforts.

Exhibit 7 lists the process outputs that hold potential as additional inputs to advance transportation system planning and decision-making processes. Relevant resource planning process outputs are described in turn in the subsections that follow.

Exhibit 7: Resource Process Outputs Relevant to Transportation Planning		
Planning Process	Process Outputs	Relevance to Transportation Planning
Air Quality	<ul style="list-style-type: none"> 5. Air Quality Plan 6. Transportation Conformity Analysis 7. General Conformity Analysis 8. NEPA Analysis 	<ul style="list-style-type: none"> • Critical to project development • Driven by regulatory requirements
Fish and Wildlife Conservation	<ul style="list-style-type: none"> 10. Species Recovery Plan 11. Species GIS Inventory 12. Habitat Conservation Plan 13. Essential Fish Habitat Designation 14. Endangered Species Act Section 7 Consultation 15. Essential Fish Habitat Consultation 16. DOT Section 4(f) Evaluation 17. NEPA Analysis 18. State Comprehensive Wildlife Conservation Plans/Strategies 	<ul style="list-style-type: none"> • Can serve as the basis for setting environmental capacity constraints • Can help to identify footprints of alternative transportation strategies • Can be used to inform visioning, alternatives development & assessment, performance measurement, and preferred strategies
Historic Preservation	<ul style="list-style-type: none"> 5. State Historic Resources Inventory 6. NHPA Section 106 Analysis 7. DOT Section 4(f) Evaluation 8. NEPA Analysis 	
Watershed	<ul style="list-style-type: none"> 7. Special Area Management Plan 8. Local Watershed Plan 9. Clean Water Act Section 404 Analysis 10. DOT Section 4(f) Evaluation* 11. NEPA Analysis 	
Land	<ul style="list-style-type: none"> 4. Local comprehensive plan 5. Forest Plan 6. Resource Management Plan 	<ul style="list-style-type: none"> • Serve as major driver of transportation needs • Can be used to ensure that land development patterns and transportation systems are consistent with environmental goals and with each other.

* Section 4(f) applies only to those water bodies that are designated for recreational use.

3.2.1 Air Quality Outputs

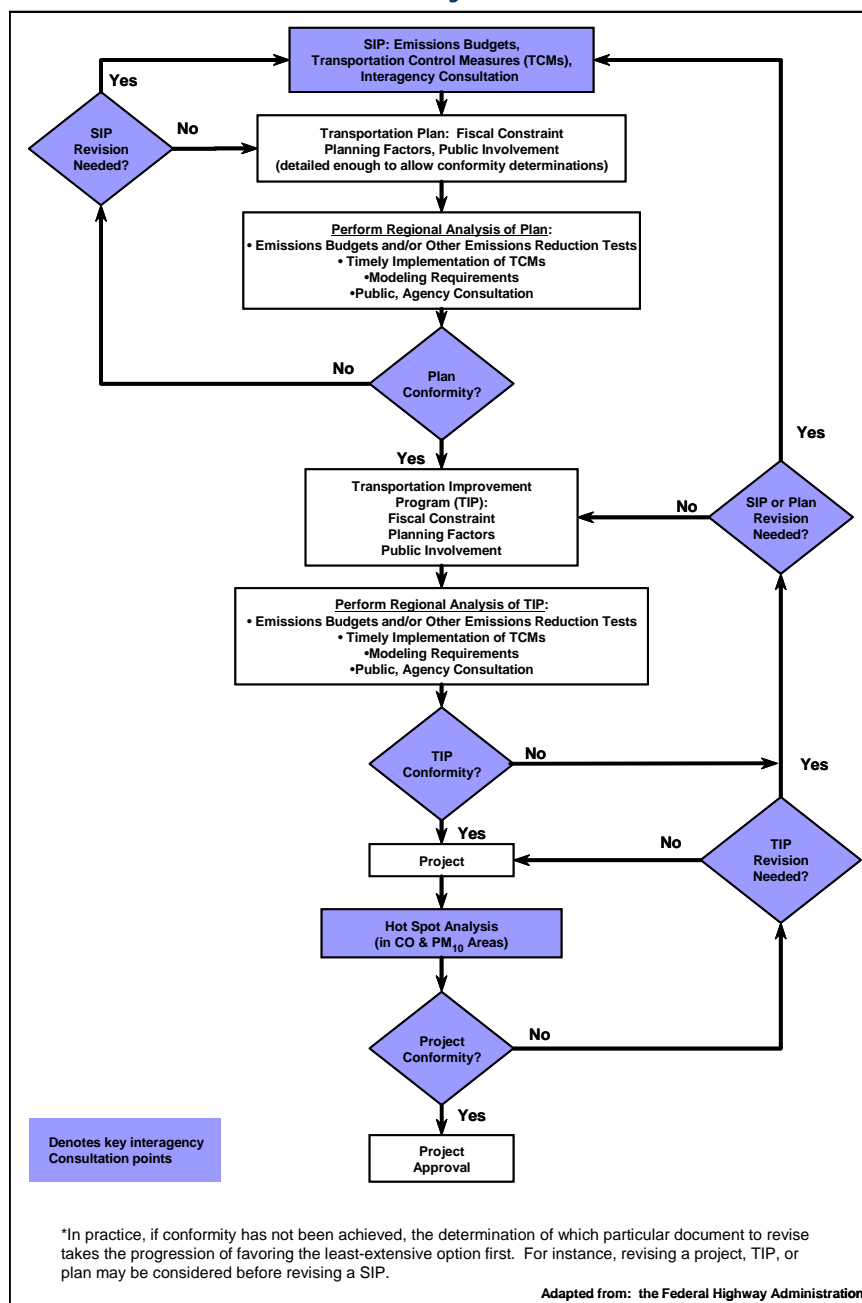
As mentioned above, air quality has already achieved a degree of integration with transportation planning processes. Air quality planning outputs are generally available for use in transportation planning processes.

Air quality planning in the U.S. began as a federally required set of activities regulated by the Clean Air Act (CAA). The U.S. Environmental Protection Agency (EPA) has final oversight authority for air quality planning, but Congress has delegated planning responsibility to the states.²⁷ States are required to prepare an air quality plan, sometimes referred to as a State Implementation Plan (SIP), when air pollution in pre-defined airsheds violates the National Ambient Air Quality Standards (NAAQS) for specific criteria pollutants. States are required to prepare air quality plans for every designated “non-attainment” area.

Recognizing that transportation projects and sources contribute significant amounts to total pollutant emissions, the CAA identified several required elements in air quality plans that require integration with transportation planning processes. Among these elements are:

- The current emissions inventory, which accounts for transportation emissions as well as other sources,
- Strategies to control future pollution sources that include Transportation Control Measures (TCMs) to reduce emissions from transportation-related activities, and
- Attainment demonstrations that clearly show how regions will attain federal air quality standards through reductions in emissions from point, area, and mobile sources (including transportation activities). This includes a requirement in most

Exhibit 8: The Transportation Conformity Process*



²⁷ Some states have in turn delegated planning responsibility to local authorities.

areas to adopt specific limits on total motor vehicle emissions known as motor vehicle emissions budgets.

These elements have necessitated coordination between air quality and transportation agencies to set air quality goals for transportation system performance.

The CAA goes even further in requiring integration, by explicitly tying federal transportation funding eligibility to air quality goals through a process called transportation conformity (see Exhibit 8, above). According to the CAA, the U.S. DOT cannot approve or fund transportation plans, programs (TIPs) or projects unless they conform with air quality plans and standards. The CAA defines conformity to mean that transportation plans, programs, and projects must help to eliminate violations of air quality standards, provide for expeditious attainment of standards, and not create or contribute to new violations of the standards, or increase the frequency or severity of existing violations. Updates of the Plans and programs are required every few years to help ensure that they are still consistent with air quality goals.

The CAA also requires conformity for other federal activities known as general conformity. An analogous, although slightly different, set of requirements has also been established for general conformity, which port and airport planning and some other federal actions are subject to. The objective is to again ensure that federal actions are supportive of air quality goals. Airport and port planners are required to coordinate with air quality planners to demonstrate that additional emissions will not exceed pre-set *de minimus* levels.²⁸ If not, then either additional emissions caused by certain new port and airport projects are accounted for in the air quality plan, or it would be required to demonstrate that such emissions would be offset fully by other activities.²⁹ Port and airport authorities are responsible for paying for or achieving those reduction offsets.

In general, the legal construct for transportation conformity has created a strong link between air quality planning and transportation planning, compelling planners to share information and determine performance goals in a coordinated fashion. Coordination is required not simply at the project development level, but also at the systems planning level.

Conformity has been instrumental in fostering greater integration. Air quality goals, in the form of emissions budgets, are clearly set for the performance of planned transportation systems. Decision-support tools have evolved to better capture the consequences of transportation strategies on air quality by linking the modeling of transportation demand and the emissions impacts of vehicular travel. In addition, laws and regulations have clarified the roles and responsibilities for each agency during the planning process, requiring local transportation agencies to conduct pre-specified

²⁸ *De minimus* levels have been set by EPA for certain air pollutants and for certain air quality designations.

²⁹ Specifically, if an airport is located in an air quality non-attainment or maintenance area, the FAA must determine that an airport's project or action meets the general conformity requirements of the CAA, which requires demonstrating consistency with the intent of reducing and eliminating air quality violations and providing for expeditious attainment of air quality standards. It is therefore in the best interest of the airport operator to work closely with state, local, and federal air-quality agencies to ensure that the SIP and the project together account for all emissions at the airport and offset any excess emissions.

conformity analyses and seek consultations with air quality agencies, EPA, and state and federal transportation agencies.

There are shortcomings to the current integration process. Lack of direct involvement by land use decision-makers in the transportation conformity process limits the potential to discuss integrated transportation and land use responses to improve air quality. Also, transportation agencies have generally looked closely at air quality goals only after they develop their plans rather than during the plan development process. This limits the degree to which air quality concerns are incorporated into development of and decision-making on the plans. The involvement of air agencies in transportation plan development and decisions has been limited. Similarly, transportation agencies have often not been involved in air quality plan development to a degree which would achieve optimal integration. But generally, air quality integration has raised the level of understanding of interactions between air quality impacts and transportation substantially, and improved the quality of the transportation planning process.

NEPA-related air quality analysis may also be of use earlier in the transportation planning process. The examination of air quality impacts for individual projects required by NEPA includes additional aspects not regulated at the regional scale that, if collected over a number of previous projects and conducted on a landscape scale, provide additional information to build a picture of the air quality footprint of transportation strategies within system planning processes.

Despite occasional shortcomings, the outputs of air quality planning are readily useable in transportation processes. Air emissions budgets, caps and related planning assumptions (VMT, growth forecasts, etc.) could be used as performance standards which are used in developing the transportation system plans. Additionally, the potential or adopted Transportation Control Measures (TCMs) for air quality plans, which identify various transportation strategies that can improve air quality, could inform the alternatives development step of the transportation planning process by showing strategies that support both mobility and air quality goals. Potential transportation improvement strategies, then, could be developed with the goal of optimizing the air quality performance of the future transportation system, using TCMs as bases for potential projects. These alternative strategies could be measured and evaluated by their air quality performance. Such evaluations could utilize the modeling tools required by conformity to evaluate the air quality impacts of transportation strategies. Not all air quality plans include TCMs. Where they do, TCMs could be valuable strategies to help develop environmentally superior transportation plans.

In such processes, the benefits of transportation strategies that minimize their impact on air quality become clearer, such as providing mobility via multiple travel modes to offer users choices that are more beneficial to air quality. Such strategies are most effective when combined with land use strategies that best support multimodal travel, such as more compact development patterns that feature multiple land use types within close proximity, pointing to the importance of land use planning linkages.

3.2.2 Fish and Wildlife Conservation Outputs

Both landscape-scale and site-specific fish and wildlife conservation outputs currently exist, but are generally housed in multiple, dispersed sources. With additional investment of effort, such information could be gathered into centralized information sources for use in transportation planning processes. Additionally, information regarding the nature of transportation impacts on fish and wildlife, as well as transportation-related conservation concepts, currently exists. Although more effort could be expended to improve the understanding of such interactions, these outputs can be carried now into the early stages of transportation decision-making.

Many wildlife conservation planning activities are driven or influenced by federal legislation, including: the Endangered Species Act (ESA), the Magnuson-Stevens Act (MSA), the Fish and Wildlife Coordination Act (FWCA), and the Migratory Bird Treaty Act (MBTA). These statutes commit the federal government to protecting endangered species, migratory birds, and federally-managed fish species, and charge two federal agencies with planning and implementation activities: the US Fish and Wildlife Service (FWS) and the National Oceanic and Atmospheric Administration (NOAA) Fisheries Division. FWS and NOAA Fisheries conduct a number of activities related to fish and wildlife conservation planning that are relevant to transportation processes. Their activities include protecting terrestrial and marine habitat lands, creating an important link between land planning and fish and wildlife conservation. State and local governments also play roles in fish and wildlife conservation planning with which transportation processes should coordinate.

Federal fish and wildlife conservation activities produce a number of outputs that detail which species and resources need protection, where they are located, and how human activities affect them. These outputs could be used to both elucidate the resource impacts of transportation, as well as inform the development of transportation improvement strategies that are more likely to avoid or minimize those impacts.

- **Which species and resources to protect.** FWS lists fish, wildlife, and plant species that are endangered or threatened on the federal Endangered Species List, as mandated by the ESA. Because the listing process is time and resource intensive, some species deserving of listing have not yet been listed.³⁰ Information gathered for these determinations include life history, habitat, current status, and trends. Also, any federally managed fish species, regardless of endangered status, are also protected under the MSA. Migratory birds are also protected under the MBTA regardless of endangered status.
- **Locations of important species and resources.** ESA-related activities produce outputs that indicate locations where species occur on a nationwide basis, including, but not limited to, Critical Habitat designations. Status Reviews, Species Recovery Plans (SRPs), and Candidate Conservation Plans (CCPs) have been developed for some ESA-listed and candidate species; these documents also contain some habitat information, although they have not been completed for every important species. In addition, Habitat Conservation Plans (HCPs) have been prepared in a few cases to

³⁰ FWS nonetheless engages in a set of activities to protect these candidate species.

inform species conservation efforts on a landscape level (see Box 9, below). To fulfill MSA mandates, NOAA Fisheries also carries out a set of activities to describe and identify Essential Fish Habitat (EFH), as well as to designate Habitat Areas of Particular Concern (HAPC), typically as part of a Fishery Management Plan (FMP) for individual federally managed fish species. But EFH has not yet been comprehensively designated. To be sure, the quality and specificity of all habitat information vary widely from region to region and from species to species. As an additional consideration, some geographic species information is considered sensitive, because of threats caused by poaching or other detrimental activities, and should not be shared in the public domain.

Federal statutes authorize agencies to consult on and issue permits for individual projects, including the ESA and MSA, and FWCA. Much of the supporting analysis for these consultations is conducted as part of NEPA analysis, as well as U.S. DOT Section 4(f) evaluations. Such analysis takes a site-specific, project-level perspective that is directly useful for conducting determination and permit reviews, rather than a landscape-scale perspective that is more useful in systems planning processes. But collected over a number of projects, such information could be used to piece together a landscape-scale picture of resources in an area.

In fact, work has already been performed in some states to combine habitat information from multiple sources, including landscape- and project-level analyses, into central, GIS-based databases that house information on species. Such databases are not yet comprehensive for most states, but in some cases, extant information is robust enough to inform transportation decision-making processes, and work is continuing to strengthen the comprehensiveness of the inventories.

These databases could be used to construct transportation improvement strategies that avoid sensitive habitats. 'Fatal flaw' analyses could also be conducted on proposed transportation strategies to determine if critical resources exist where transportation projects are planned, enabling adjustments to be made before significant investments are made in pre-project-development work, and before significant political momentum builds for such projects. The databases could also be used to shed light on

Box 9: Quino Checkerspot Butterfly Recovery Plan

This document lays out a plan to recover the Quino Checkerspot Butterfly, which primarily are located in Southern California. The plan includes the following information on the species:

- Description and Taxonomy
- Life History
- Distribution and Habitat Considerations
- Reasons for Decline and Current Threats
- Current and Evolving Conservation Methods
- Recovery Strategies, Criteria, and Actions

Excerpt: Quino Checkerspot Butterfly Occurrences



Source: U.S. Fish and Wildlife Service. (2003). *Recovery Plan for the Quino Checkerspot Butterfly (Euphydryas editha quino)*. Portland, Oregon. 179 pp.

the kinds of mitigations that might be necessary for transportation projects that impact fish and wildlife, and what such mitigations might entail in terms of cost and effort.

Finally, a recent development in federal legislation has created a mandate for states to develop Comprehensive Wildlife Conservation Plans/Strategies by October 2005 in order to become eligible to receive funding for conservation activities from the Land and Water Conservation Fund. Such strategies are required to prioritize species and habitats and describe actions that would help conserve key species. Although not yet completed for all states, such efforts may provide significant amounts of important information relevant to integrated planning efforts.

- **How species and resources are affected by human activities.** ESA listing activities, SRPs, FMPs, and consultation processes carried out by FWS and NOAA Fisheries in fulfillment of their federal responsibilities produce information regarding the effects of human activities on fish, wildlife, and plants. These effects may include threats to numbers, distribution, quality, and regeneration/reproduction. Actions are identified that can reduce or avoid the human-induced threats, including reducing loss or degradation of habitat. In addition, NOAA Fisheries has in some cases produced design resources to provide guidance on ‘green’ infrastructure designs, such as those for fish passage and marine mammals. Such outputs can be invaluable in transportation planning processes, providing information during project designs that could be used to avoid or minimize fish and wildlife impacts. These outputs could be used to develop design commitments to ensure that the most resource-friendly designs are applied to individual transportation projects emerging from planning processes in exchange for fewer consultation and permitting requirements.

As fish and wildlife outputs are infused into transportation decision-making processes, the types of transportation strategies that provide mobility options that result in fewer and less powerful impacts on wildlife become favorable. And these strategies can be most effective when supported by commensurate land use strategies, such as more compact land development and mixes of land use types within close proximity.

3.2.3 Historic Preservation Outputs

Outputs from historic and cultural preservation activities are generally limited to project- and site-specific inventories of resources. While they exist in some instances, landscape-level inventories are not common, and additional resources are needed to generate such inventories in a more comprehensive fashion. Only after this work has been accomplished will historic and cultural preservation outputs be truly effective in affecting transportation planning.

The National Historic Preservation Act (NHPA) governs federal historic preservation efforts. NHPA creates the National Register of Historic Places, authorizes the independent Advisory Council on Historic Preservation (ACHP) to coordinate historic preservation at the federal level, and empowers each state to conduct historic preservation through State Historic Preservation Officers (SHPOs).

SHPOs can receive grant funding from the federal Historic Preservation Fund to develop state historic preservation plans. But rather than engaging in preservation efforts outright,

such as cataloging the historic resources in the state or discussing future preservation activities on a geographic basis, a state plan typically places focus on activities in which the SHPO will engage to promote historic preservation. Little geographic information on cultural resources is available, and what is available may exist in non-digital formats. An exception is the availability in a few states of historic resource inventories in GIS-based formats. Efforts could be invested to bolster the comprehensiveness of historic and cultural resource inventories and to create spatially referenced databases.

As in fish and wildlife conservation, the bulk of historic preservation efforts focus primarily on reviews of individual transportation projects, as authorized by federal law. NHPA's Section 106 requires federal agencies to take into account the effects of specific transportation projects on historic properties and to consult with the applicable SHPO, the ACHP, and interested members of the public. Such consultations are generally documented within NEPA and DOT Section 4(f) evaluations. Compiled over a number of projects, such information begins to form an inventory of the cultural resources in a geographic area. Additional work to gather similar information could also be conducted on a landscape scale, and combined project review and planning related cultural resource inventories could be used in 'fatal flaw' analyses of proposed transportation improvement strategies.

3.2.4 Watershed Outputs

Watershed planning is in a state of transition, and although water-related planning activities have been undertaken under several different auspices, few landscape-scale outputs are currently available to carry into transportation processes. As watershed planning becomes more widespread and more standardized, more outputs will become available for the development of integrated transportation plans.

At the federal level, the Clean Water Act (CWA) and other statutes have given primary federal water-related responsibilities to the Environmental Protection Agency (EPA) and the Army Corps of Engineers (ACE).³¹ Of particular interest to transportation processes are ACE's responsibility for managing the nation's waterways, including wetlands, and EPA's responsibilities for maintaining federal standards for water quality, as well as those relating to wetlands that are shared with ACE. EPA has been assisting states to set pollution controls for individual water bodies under the Total Maximum Daily Load (TMDL) process, and states have been implementing programs to manage water quality to those standards. Meanwhile, wetland preservation planning has proceeded under a disparate set of activities conducted by ACE and EPA. Under Section 404, the CWA grants these agencies authority to regulate the dredging and filling of wetlands, and creates a permitting process for individual projects proposing to do so.

The state of practice in water-related planning is currently transitioning from a water-body- and project-based approach to a more landscape-scale, watershed-based approach. The watershed approach brings together previous, disparate planning efforts relating to water quality, quantity, and conservation, in a single, comprehensive process, including the wetland and water quality activities overseen by EPA and ACE. Numerous states and

³¹ Numerous other government agencies at the state and local levels also engage in various aspects of water planning.

localities have begun to adopt the watershed approach, forming local, watershed-based institutional structures to build consensus on actions needed to sustain and support healthy watersheds. In a few localities, ACE has also shifted its wetland permitting approach to a more watershed-based perspective by developing Special Area Management Plans (SAMPs), which identify critical wetland resources within a watershed.

At this formative stage in watershed planning, integration with transportation processes is particularly challenging. Although EPA is disseminating guidance on watershed planning methods, the state of practice widely varies. Institutional structures are not standard, as many watershed planning efforts are formed as new partnerships among several existing agencies. In some cases, the data required to support the watershed planning process are not yet collected in a systematic fashion, and decision-support tools do not currently include the capacity to analyze interactions between transportation and water quality. Outputs from local watershed planning processes are therefore neither common nor consistent. ACE's SAMPs have proved resource-intensive, and are not currently common practice. ACE is also developing a comprehensive GIS database of critical wetland resource locations, although it is not yet ready to be shared among agencies. More work and resources clearly are needed to bolster the comprehensiveness of this new watershed approach, but solid foundations have been laid for creating more useable water resource planning outputs.

Outputs produced in the NEPA and permitting stages of individual projects also include information that can be carried back to transportation planning, including wetland analysis, CWA Section 404 analysis, water body modification analysis, floodplain analysis, wild and scenic rivers analysis, coastal impact analysis, and DOT Section 4(f) evaluations. This information could be collected over a number of projects, and additional work could be conducted to obtain similar information on a landscape basis.

This information could be further combined with existing watershed-scale data to build a landscape-level picture of important wetland resources in a geographic area, infusing integrated planning processes with critical information. For instance, characterizations of waters and analysis of factors affecting water quality could inform the development and evaluation of transportation improvement strategies. Action plans that are part of the watershed process could provide information about the kinds of transportation strategies that can improve water quality within the watershed, including designs of transportation infrastructure that address urban runoff issues. Geographic hydrologic information could provide the basis for locating potential transportation projects to avoid or minimize impacts to critical wetland and stream resources, as well as illuminate any potential mitigation implications.

As a water resource lens is applied to the analysis of transportation and land use strategies, the water resource benefits of some types of strategies become more apparent, such as land use policies that favor more compact development to preserve more natural open space, and the multimodal transportation system improvements that best serve that kind of development pattern.

3.2.5 Land Outputs

The resource conservation planning outputs discussed above could be useful in transportation processes individually, but an integrated process that entails land planning as well has greater potential to effectively optimize among environmental, social, and economic objectives. Therefore, the success of efforts to move toward an integrated approach relies in large part on the ability to integrate with land planning.

Roughly 30 percent of U.S. land area, mostly in the western U.S., remains under the nominal control of the federal government under various agencies and departments.³² Each federal entity engages in land use planning to accomplish mandates set forth in federally enacted regulation. For the remaining 70 percent of U.S. land area, state governments hold land use authority. In most of these areas, however, state legislatures have transferred this authority to local municipalities and county governments.

Land development often acts as the main driver for transportation demand, and transportation improvements often enable further land conversions for urban development, which in turn directly affects natural resource outcomes. These interactions are more pronounced on locally managed lands than on federal lands, since federal lands are generally not managed for urban development, creating a greater need for integrated planning on locally managed lands than on federal lands. Moreover, owing partially to federal requirements, federal land agencies have managed to achieve a higher degree of integration with transportation and environmental goals. Federal agencies already conduct long-range land planning activities that include natural and cultural resource analysis to match appropriate land use types to appropriate geographic areas, including transportation rights-of-way. Federal and state transportation agency coordination has also been higher with federal land managers than with local land use jurisdictions.

For these reasons, local land planning processes are essential components of an integrated planning approach. Integrated planning relies on joint consideration of land, transportation, and environmental goals and interactions. But, current local land planning practices struggle to take into account natural resource concerns.

Local governments generally manage land use by exercising zoning authority, the legal ‘police power’ of a government to regulate activities on land within its jurisdiction. They do so dividing lands within the jurisdiction into districts and assigning them to defined zoning permit categories, which indicate the types of uses, including the type of urban development that is permitted. This public power to promote the health, safety, and general welfare of the area’s residents is balanced by the private property rights guaranteed by the U.S. Constitution, resulting in evolving court-system interpretations of the extent of governmental control over privately-owned land.

Zoning is distinct from planning in that zoning provides the legal basis to control land use, while planning provides the goals, strategies, and analytical support to guide zoning maps and regulations. Zoning power did not originate with concurrent planning obligations; the concept of land use planning, in part to avoid legal challenges on the

³² Effective control, however, often rests with private interests such as mining companies, livestock operations, and logging firms.

basis of arbitrary and capricious use of the ‘police power’, evolved later to make land use planning more widespread.

Although processes differ across local and state boundaries, the current trend in municipal planning involves the adoption of what variously is referred to as a master, general, or comprehensive plan, to act as a guide for the future course of development. The comprehensive planning process has the potential to build community visions for urban form, growth, housing, resource conservation, and transportation, and to realize those visions through land use controls. Some jurisdictions have pushed to fulfill this potential, adopting comprehensive plans as a means to accomplish growth management objectives such as Smart Growth, while others continue to utilize the comprehensive plan merely as a legal tool to support zoning regulations.

Land use planning processes could serve as the foundation upon which truly integrated planning processes could be built (see Box 10). Strategies for changing land use and improving the transportation system could be developed jointly, to better account for their interactions. Use of geographic-based natural and cultural resource information, as well as analysis tools that help to elucidate the interactions among transportation, land use, and natural systems, enables these strategies to be developed with natural and cultural effects in mind, and evaluated according to overall impacts to resources. Tools such as scenario planning offer a framework to examine these interactions. As these resource concerns are more tightly integrated with economic and mobility concerns, the benefits of transportation and land use strategies that minimize resource impacts become more apparent, such as more compact land development patterns served by a multimodal transportation system that provides accessibility by offering a variety of choices in terms of travel modes and eliminating barriers to access by transit and non-motorized means.

Box 10: Airport Planning and Land Use

Airport master planning is already integrated somewhat with land-use planning. For example, during the inventory step of the planning process, the airport operator gathers data on land use adjacent to the airport. This information includes comprehensive land-use and transportation plans, municipal zoning ordinances, and other applicable land-use controls. The airport operator uses this information to determine whether any current or planned land uses would affect the way the airport can be expanded.

However, natural resource information and conservation goals are generally not included as part of the current state of practice in land use planning. Moreover, transportation strategies are generally developed using future land uses as inputs, rather than concurrent parameters that could be used to develop joint land use and transportation strategies. Disconnects among land use, transportation and resource concerns at the local level serve as a challenge to an integrated planning approach.

This disconnect is contrasted with the more holistic approach to land planning on federally managed lands. There, federal statutes and regulations establish requirements for consideration of environmental impacts of land management strategies and extensive public input in goal-setting and evaluation activities. While there is room for improvement, coordination among federal and state agencies to engage in integrated planning activities has been relatively successful, compared with such efforts on the local level, and could be used as potential models for how local planning coordination could take shape.

3.3 Other Strategies for Resolving Challenges

To truly capitalize on information-sharing and integration opportunities, and to set the stage for a higher degree of inter-agency collaboration and coordination, it is insufficient to simply understand the kinds of planning outputs available for inclusion in transportation processes. Additional strategies, as noted in the beginning of this Chapter, are necessary to resolve the challenges identified in Chapter 2. Within existing institutional contexts and the current state of planning practice, the ways in which government agencies can and have responded to overcome these challenges and incorporate resource concerns throughout the stages of the transportation planning process become the pathways to better integration.

These responses are grouped into three broad categories:

- Institutional Issues
- Data and Tools
- Decision-Making Processes

Each is discussed in more detail in the following subsections.

3.3.1 *Institutional Issues*

Institutions are at the core of integrated planning. The ways in which they can evolve to resolve challenges and facilitate integration are essential steps toward integrated planning, and mechanisms that can spur these evolutions are important catalysts for change. They are as follow.

- **Executive-Level Leadership.**

As discussed in Chapter 2, shifts in organizational structures and cultural views are needed to facilitate resource agency

engagement in integrated planning processes. Executive leadership from both resource and transportation agencies can form an effective response for organizational and cultural change (see Box 11). Inter-agency task forces can help to bridge the gap among agencies and build trust at the executive level. These task forces can also be helpful in identifying agency-specific ‘champions’ who can then institute the organizational shifts necessary to direct resources toward integrated planning. These champions can also initiate shifts in cultural views throughout staff ranks to help build the trust that is essential to achieving close and productive inter-agency collaboration.

Box 11: Oregon’s Collaborative Environmental and Transportation Agreement for Streamlining (CETAS)

Oregon DOT has developed the Collaborative Environmental and Transportation Agreement for Streamlining (CETAS) to merge the NEPA and 404 processes, as well as to facilitate efforts to improve environmental and transportation decision-making. By approving CETAS, ten federal and state transportation and resource agencies have pledged to engage in mapping of natural and cultural resources, developing a habitat mitigation program, and to consider habitat restoration and the protection of threatened and endangered species in planning processes. CETAS also promotes early NEPA coordination through monthly project coordination meetings, during which project briefings are made and agreement is reached on the level of environmental analysis required. Once concurrence is reached, issues are not revisited unless major changes occur, such as Oregon DOT (ODOT) project changes or new endangered species listings.

CETAS has enjoyed support from top management at ODOT and FHWA’s Oregon Division, both of which championed the formation of the agreement. ODOT also pays for transfer-funded employees at state and federal resource agencies to make sure that sufficient resources are available for CETAS to function effectively.

➤ **Reserving a ‘Seat at the Transportation Planning Table’.** Although local, state, and federal agencies are charged with implementing many surface transportation projects, the planning processes that provide the context for and produce those projects are led by metropolitan planning organizations (MPOs). And if federal resource agencies are struggling to coordinate with other federal-level transportation agencies, then the struggle is even more challenging at the local level, where local officials sometimes do not understand the intricate federal project delivery implications of planning decisions. Furthermore, federal and local agencies have not been given guidance on how to interact in a planning process, placing many of the potential gains through early coordination at risk of being dropped as planning decisions coalesce into projects for implementation. If integrated planning is to take hold, then it must be at the MPO level, and the process must define clearly how resource agencies, land use agencies and the public are to be involved.

MPOs appear to be the most effective forums for integration issues with regard to surface transportation. With their regional, landscape-scale outlook, their strong connections to local land use decision-makers, and their ability to involve a broad range of local stakeholders in the planning process, MPOs are already well-suited to host regional dialogues about growth and its impacts, and many have done so (see Box 12). Using this foundation and further broadening the range of stakeholders to include resource agencies would be an effective way to build discussions about transportation, land use, and environmental interactions into existing planning processes.

The effectiveness of a ‘seat at the table’ is dictated in large part by the extent to which all agencies are equipped with an understanding of what a ‘seat’ means. First, informative cross-agency, cross-disciplinary dialogue is needed to elucidate the steps and functions of transportation planning processes and the points within where environmental concerns and

Box 12: Lansing, Michigan, Tri-County Regional Planning Commission

In the Lansing, Michigan, area, a large metropolitan area that includes 78 separate land use jurisdictions, fast-paced growth prompted the MPO, the Tri-County Regional Planning Commission, to undertake a regional growth process to build consensus on a growth management approach.

Project elements included a GIS-based land inventory of existing and currently planned future uses, scenario-planning and predictive modeling to describe possible future land uses, analysis to compare the impacts of various policies, and an extensive public process that included visual preference surveys to build consensus on a preferred regional land use vision.

The outcomes of the project included and adopted a set of land use goals, and a land use policy map. TCRPC’s Board of Directors will use the goals and map to establish priorities for federal aid transportation projects. In this way, the regional land use outcomes serve as foundation for regional transportation plans.

Box 13: Arizona Inter-Agency Operating Agreement

In Arizona, the Bureau of Land Management (BLM), FHWA, and the Arizona Department of Transportation (ADOT) have signed an Inter-Agency Operating Agreement that clarifies how the agencies will coordinate and interact during transportation planning activities on BLM lands. The agreement includes details regarding agency responsibilities, agency objectives, areas of cooperation, coordination procedures, coordination meetings, and conflict resolution procedures. The agreement is expected to reduce the average time required for processing federal appropriations for transportation projects on BLM lands.

Sources:

FHWA Environment Division, *State Environmental Streamlining Practices Database*

Memorandum of Understanding Between the Arizona Department of Transportation, the Federal Highway Administration, Arizona, and the Bureau of Land Management, Arizona. April 23, 2003.

information can be effectively utilized. Second, multi-agency arrangements work best when formally institutionalized. Inter-agency Memoranda of Understanding (MOUs) and Agreement (MOAs) can clearly define the ways in which agencies will interact with each other throughout the planning process, and the commitments to which agencies pledge to adhere as plans are developed and projects are programmed and implemented (see Box 13).

- **Mechanisms to Share Staff Resources Across Agencies.** A ‘seat at the table’ is also not effective unless resource agencies are able to expend staff resources toward that involvement. As discussed in Chapter 2, resource agencies are particularly hard-pressed to manage staff resources, because much of their work is related to project review and permitting, the extent and timing of which are dictated by action agencies.

This fact has long been recognized, and an institutional mechanism to address this shortcoming has already been implemented successfully across the nation. Transfer-funded positions have allowed state DOTs to fund specific positions at resource agencies that then can be dedicated solely to FHWA/FTA project review responsibilities (see Box 14). There are several options for institutional arrangements regarding to whom the position is directly responsible and how the funds are exchanged between agencies.

There may, however, be restrictions on the use of federal project money for funding resource agency positions that may become involved with planning functions. Some resource agency staff seem to feel tightly restricted in the activities in which they engage, while others do not. The difference may lie in the source of funds used in the transfer-funded position. This point warrants further investigation for clarification regarding the use of funds, if such positions are to be utilized to more actively engage resource agencies in planning activities.

Box 14: Transfer-Funded Positions

More than half of state DOTs are participating in transfer-funded agreements, funding over 150 positions at resource agencies to supplement their project review capabilities. Federal agencies receiving transfer funds include: ACE, FWS, NOAA Fisheries, EPA, BLM, and the Forest Service. A number of state resource agencies receive funding as well.

These transfers have facilitated early transportation project reviews, inter-agency environmental scoping, enhancement of natural resource inventories, and participation in system planning activities. Beyond improving project review timelines, transfer-funded positions have helped to improve communication, understanding, and trust between transportation and resource agencies.

Source: “State DOT Positions at Resource Agencies: Distribution, Limitations, Accomplishments, and Maintaining Accountability.” AASHTO Environmental Technical Assistance Program Standing Committee, August 2001.

- **Stronger Institutional Linkages to Local Land Planning.** Because land use is such an integral component of integrated planning, any integrated planning effort will need to include stronger linkages with local land planning processes. While respecting the local desire to preserve home rule, federal agencies can still utilize existing institutional linkages to promote integrated consideration of economic, social, community, and environmental objectives. MPOs have already enjoyed some successes in this arena, having convened regional dialogues on the impacts of growth and ways to address those impacts. Such efforts represent potential opportunities for

federal agencies to link environmental and transportation concerns into regional growth discussions.

3.3.2 Data and Tools

To infuse planning processes with the data needed to fully understand interactions between transportation and other systems, ways are needed to share the information outputs of resource agency planning activities and to carry them over into transportation decision-making among agencies. The key components to information sharing are discussed below.

- **Inventory of Natural and Cultural Environmental Resources.** First, as discussed earlier in this Chapter, there exist significant data needs. Some resource data sets exist, but are dispersed among disparate sources. These data can be consolidated into a comprehensive set of inventories, which can then be augmented and updated with new information over time.
- **Technologies For Integrated Data Systems.** The second necessary component concerns technology for organizing data. Technologies for integrated data systems, such as GIS and remote sensing, are quickly maturing and are widely available to government agencies as tools to facilitate the collection, organization, integration, analysis, and dissemination of information. With internet-based communications technology, these information systems can be easily shared, and all the relevant data produced by interaction among agencies, including data on proposed transportation projects, comments on those projects from reviewing agencies, and dialogues about points of contention can be captured within the system along with resource inventories. Essentially, agencies can then manage the entire coordination process electronically.
- **Information Sharing and Dissemination Processes.** The third necessary component concerns the processes used to share and disseminate information. These processes can be developed and formalized by institutional arrangements that define the manner in which information is distributed. Some types of data are sensitive and should not be made public. Data-sharing processes can be constructed in such a way that preserves the sensitive nature of such data while infusing the transportation planning process with information to be utilized in an integrated approach.

3.3.3 Decision-Making Processes

If the above institutional and data issues are adequately addressed, the resulting changes in transportation project development would move the states of resource and transportation planning practice toward a more integrated approach. The nature of such changes is delineated below.

- **Multiple points of coordination.** One result of strides made to clear institutional and data hurdles is greater coordination between transportation and resource agencies at multiple points throughout all stages of transportation decision-making. As data, analyses, and information are shared and improved, planning processes become more transparent and more accessible to all stakeholders. Electronically managed review

and comment technologies and clearly defined operating agreements among agencies enable stakeholder input at all decision points. Resource agencies receive the staffing levels needed to become substantively involved earlier in the process, and, equipped with the necessary natural and cultural resource information, are better able to inform the transportation planning process of the potential effects of alternative transportation strategies, and get less environmentally damaging strategies adopted.

Clearly, transportation and environmental interactions occur at a variety of scales, from site-specific, micro-scale interactions to landscape-level, macro-scale interactions. One of the keys to integrated planning is to match the appropriate level of interaction analysis with the appropriate strategy options at the appropriate stage in the transportation decision-making process, from the landscape-level, long-range planning perspective of broad strategies, to the site-specific, project implementation perspective. This matching can be done by determining the level of specificity in transportation project and resource information needed at each stage. Establishment of multiple points of coordination, rather than one point at the site-specific level, enables discussions to be contained within appropriate scale at the appropriate time.

- **Early and sustained commitments.** Another important result of resolving institutional and data issues is the enhanced ability for agencies to make early and sustained commitments, formalized via inter-agency MOUs and MOAs.

In making the above progressions, transportation agencies are better equipped to commit to conducting specific types of analysis and considering specific types of strategies appropriate to the scale at which strategies and projects are being proposed, from the landscape-scale in the systems planning stage to the site-specific scale in project development stage. And equipped with better information regarding the environmental effects of transportation strategies and projects, transportation agencies are better able to commit to advance mitigations, context-sensitive solutions, and standards for system performance and project designs that minimize or compensate for impacts. Lastly, transportation agencies can formalize commitments to follow through on these early commitments through monitoring and accountability efforts, both during and after project implementation. These commitments give resources agencies assurances that projects from the plan will incorporate environmentally friendly features, or if unavoidable impacts become clear, advance mitigation for them. Some of these commitments have been made before under programmatic actions; slight modifications would enable such commitments in the context of a transportation plan.

For their part, resource agencies are also better equipped with information to make commitments that foster trust on the part of transportation agencies. For example, given the assurance that transportation agencies will strive to develop and implement more resources-friendly alternatives, conduct appropriate analysis at all points in the decision-making process, utilize resource-friendly design guidance to craft projects, and support advance mitigations if deemed necessary, resource agencies can commit to cooperating to streamline subsequent reviews for projects emerging from the integrated plans. Mechanisms to do so already exist for programmatic actions, and could be adapted to support this more complex type of inter-agency coordination.

It should be noted that additional changes may be needed in law, regulation, or guidance to best support these progressions. Agencies are currently able to engage in this kind of integration, but questions may arise regarding the legality of such efforts, since it has not been attempted before. Clarification on legal issues may need to be provided by DOT, the resource agencies, and the Council on Environmental Quality (CEQ).

- **Planning as the Basis for Strong Purpose and Need Statements and Impact Assessments.** If transportation agencies are successful in making these progressions toward more integrated planning processes and better analyses, the benefits of such progressions are also realized in project implementation. First, projects emerging from an integrated approach are more easily linked to overall strategies for fulfilling community visions. This linkage between individual projects and the overall context for transportation within a community vision that is developed by an integrated approach provides a strong basis for the Purpose and Need Statements written for individual projects as part of the initial work conducted for the Environmental Impact Statements (EIS) required by the NEPA process. Similarly, the system analysis conducted as part of integrated planning processes can serve as the basis for direct, indirect, and cumulative impacts assessments of project alternatives. For example, cumulative impact analyses attempt to address the broader effects of collective transportation projects, as well as other reasonably foreseeable private and public actions, on human and natural systems. Integrated planning provides a landscape-level analysis of these broad-ranging interactions, as well as concepts for how transportation projects can best meet resource conservation objectives. Much of this advance work can be carried into the indirect and cumulative Impact analysis for individual projects emerging from integrated processes.

4. Examples of Innovative Practice

Across the nation, transportation and resource agencies have pushed the envelope on current planning practice, making concerted attempts to address the integrated planning concepts laid forth in Chapter 3 and achieve better resource and transportation outcomes. This Chapter showcases some of those attempts, featuring case studies that focus on these integrated planning concepts.

Practitioner interviews conducted as part of the Integrated Planning Work Group's baselining effort uncovered a multitude of such innovative practices, a sign that denotes the emergence of evolutionary steps in the progression toward integrated planning. The discussions produced a compendium of examples, each of which was investigated to build a general understanding of the effort and its potential relevance to advances in integrated planning.

Several aspects made certain efforts particularly noteworthy from the standpoint of demonstrating the feasibility of, and implementation issues posed by, a more integrated approach. For instance, as a pre-requisite component of integrated planning, effective inter-agency coordination was sought out as a critical concept to illustrate. And because integrated planning is reliant on effective use of information in the planning process, examples of successful application of tools and technology for data gathering, analysis, management, and sharing also stood out as important exhibitions. Finally, institutional mechanisms were also sought after, specifically those enabling the sharing of staffing resources among agencies, and those enabling agencies to formally delineate new ways in which they interact within the context of integrated planning. Efforts targeted specifically at streamlining the permitting and environmental review process were noted, but a planning element was deemed necessary for such efforts to be considered exemplary, rather than efforts that produced efficiency gains solely by consolidating disparate review and consultation processes.

The most promising examples were carried forward for further investigation. Specifically, the practices were explored in greater depth for the experience and insights they might offer regarding previous attempts at:

- *Institutional arrangements* to facilitate streamlined decision-making,
- Use of *data and tools* to better address environmental considerations,
- Formal modifications to the transportation *decision-making process*, and
- Creating *integrated transportation plans*.

A shortlist of these most promising examples was created from these criteria, as shown in Exhibit 10 below. These practices exemplify one or more of the above concepts. Other factors included the availability of documentation describing innovative approaches, and representation across the nation.

Exhibit 10: Shortlist of Potential Innovative Practice Case Studies					
Practice	Description	IA ¹	DT ²	D-MP ³	IP ⁴
Florida ETDM	A new transportation decision process to be used throughout Florida that incorporates environmental concerns and data at multiple stages	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Riverside County Integrated Project	An integrated planning process to plan for future land development, conservation, and transportation in southern California				<input checked="" type="checkbox"/>
Massport and Boston MPO Coordination	Close coordination between an airport authority and an MPO for strategies to reduce airside congestion at one airport by improving groundside connections to other airports in the Boston region				<input checked="" type="checkbox"/>
Washington GIS Workbench and TPEAC	A consolidated GIS database of natural resource information to identify potential issues in transportation planning, and an interagency committee for streamlining projects using interdisciplinary teams, concurrent review, standards and best management practices, analysis methodologies, and a dispute resolution process in a 'one-stop' permitting process	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Oregon CETAS	An effort in Oregon supported by executive management at ten federal and state transportation and resource agencies to map natural and cultural resources, develop a habitat mitigation program, and initiate continuing periodic project coordination meetings to gain agreement on environmental aspects of transportation projects	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
Oregon Major Bridge Replacements	Replacement of roughly 350 bridges across Oregon through a programmatic approach to the required environmental reviews, and a tiered NEPA analysis that involves collective gathering of environmental and engineering data for all sites and 'green bridge' performance standards that facilitate less stringent review of individual bases			<input checked="" type="checkbox"/>	
North Front Range Regional Plan	A regional long-range comprehensive growth planning process in Colorado combining GIS mapping of natural resources, land use visioning exercises, and transportation strategies to address transportation, land use and resource concerns in an integrated fashion	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Minnesota GIS Database and Local Assistance Center	State-run Local Planning Assistance Center in Minnesota to support local land decision-making, featuring GIS-based data, technical assistance, and strategic planning advice on planning, zoning, and development issues	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
Indiana I-69 Long-Range Planning and GIS	GIS application developed for long-range planning and NEPA analysis for I-69 in Indiana, including environmental and socioeconomic data, used for Tiered Environmental Impact Statement, and expanded for statewide use		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Kentucky DOT Executive Direction	Executive leadership by top management to institutionalize environmental stewardship throughout all stages of transportation planning, project development, and delivery, by use of policy directives and internal training	<input checked="" type="checkbox"/>			
TERS, TEAP	A multi-agency, executive-level, collaborative approach in Texas aimed at improving the state's	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	

Exhibit 10: Shortlist of Potential Innovative Practice Case Studies					
Practice	Description	IA ¹	DT ²	D-MP ³	IP ⁴
	efforts to identify and protect priority ecological resources while streamlining regulatory processes, including application of a GIS-driven ecological assessment protocol to identify high-priority areas within each ecological region				
Notes: 1. Demonstrates innovative Institutional Arrangements that facilitate integration 2. Demonstrates use of Data and Tools for information sharing 3. Demonstrates Decision-making Process modifications for early considerations of multiple objectives 4. Demonstrates Integrated transportation Planning process					

Finally, input from the Work Group was used to further cull the shortlist for those that best exemplify the above concepts. Case studies emerging from the shortlist are:

- The Florida Efficient Transportation Decision-Making (ETDM) Process
- Oregon Major Bridge Replacement Program
- The Texas Environmental Resource Stewards and Ecological Assessment Protocol
- Indiana I-69 Long-Range Planning
- North Front Range Regional Plan

These projects demonstrate a broad range of the necessary components of integrated planning. They include efforts to re-vamp the transportation decision-making process to include earlier environmental reviews, such as the Florida ETDM. They also demonstrate the use of tiered environmental reviews for faster and more context-sensitive design, as in Oregon's Major Bridge Replacements. Efforts that involve executive-level management collaboration among transportation and resource agencies are also included, such as the Texas Environmental Resource Stewards. Advance mapping of ecological resources, a key component of integrated planning, is demonstrated in all featured projects. And finally, an attempt to bring land use and resource conservation objectives together with transportation concerns at the same time, in the North Front Range in Colorado, is also featured. Together, these projects construct a picture of Chapter 3's concepts for advancing the state of integrated planning, demonstrating key components necessary for the success of future planning efforts. Descriptions of these case studies follow.

4.1 Florida: Efficient Transportation Decision-Making (ETDM) Process

4.1.1 *Background*

The Florida Department of Transportation (FDOT) has developed one, integrated, Efficient Transportation Decision-making (ETDM) Process for its planning, development, and permitting processes for transportation projects. The ETDM Process aims to identify critical environmental and cultural issues early, to involve resource agencies and the public in the transportation planning process, to supply the necessary

data for informed decision-making, and to decrease the time and cost associated with project development and permitting.

Under the ETDM Process, dialogue among resource agencies, MPOs, FDOT, and the public begins as soon as transportation needs are articulated. The Environmental Screening Tool (EST), an internet-accessible interactive database and GIS mapping application, makes this involvement possible. After FDOT uploads new project information onto the ETDM website, the EST performs automated crosschecks among proposed transportation project sites, natural resource information, and community characteristics. Once these crosschecks are processed, the Environmental Technical Advisory Team (ETAT), made of resource and transportation representatives from the ETDM member agencies, reviews the outputs and provides feedback on potential environmental impacts, possible mitigation and avoidance strategies, and the scope of needed environmental study. Summaries of the ETAT's comments, along with the GIS outputs, are made available to the public via the web. ETDM coordinators then make sure that FDOT and MPOs receive the team's recommendations and suggested degree of effect with comments so that issues might be resolved before the project development stage. Resource agencies engage in early NEPA reviews, issuing final NEPA decisions and permits concurrently.

4.1.2 Institutional Aspects

Institutional arrangements provide the framework within which the ETDM Process functions. Memoranda of Understanding (MOUs) signed by FDOT, 23 state and federal resource and transportation agencies formalized the ETDM Process in 2001. Individual Agency Operating Agreements detail each agency's responsibilities and the kind of information to be made available at each stage of the process. Resource agencies are able to commit to ETDM requirements and timelines because transfer-funded agreements allow FDOT to pay the cost of resource agency staffing needs for project reviews and permits. For example, in exchange for a guarantee that a qualified USFWS staff person will review and respond to new projects uploaded into ETDM's EST within 45 days of notification, FDOT subsidizes USFWS' staff costs.³³ Staff members in transfer-funded positions are not only required to respond to ETDM obligations on time, but must also be available for coordination throughout the process.

The ETAT created under ETDM institutionalizes early resource agency involvement. An ETAT comprised of members from resource agencies responsible for reviewing and permitting projects exists for each FDOT district. Responsibilities of the ETATs during the planning stage include: reviewing project purpose and need; reviewing direct impacts; recommending avoidance, minimization, or mitigation strategies; commenting on indirect and cumulative effects; predicting the project's overall degree of environmental effect; and coordinating with FDOT and MPOs to address and resolve conflicts. ETATs are also responsible for more detailed avoidance, minimization, or mitigation recommendations during the project development stage, and for permit issuance at the end of project development. Because these teams have members from a range of resource agencies, and because transfer-funded staff are committed to reviewing projects on ETDM timelines,

³³ Funding Agreement between USDOF FWS and FDOT and FHWA, January 7, 2003.

FDOT and MPOs are able to adjust project plans to account for most major environmental conflicts that could arise before significant investments in time and money have been made on project development.

4.1.3 Data and Tools Aspects

ETDM's central technical component is the EST, an innovative software tool that shares data and discussions among agencies and the public via an interactive website. The EST electronically manages a number of planning process components, including the notification of new transportation needs, ETAT reviews, the sharing of baseline resource and community data, and public involvement. Transportation agencies can upload proposed project information into the EST and crosscheck it against resource agency outputs automatically, enabling ETAT members to efficiently assess the expected degree of project effects and provide avoidance recommendations to the transportation agencies. The EST's online summaries of ETAT reviews enable the public to track projects and learn of possible environmental issues. Members of the ETAT, who ensure that data submitted by agencies to ETDM are accurate and current and note data gaps that need to be filled, manage data quality. The data used by the EST are housed in the Florida Geographic Data Library at the University of Florida.

4.1.4 Decision Process Aspects

Decision-making process modifications are the essence of the ETDM Process. Under Florida's former transportation planning and development process, transportation agencies developed a long-range transportation plan based on mobility needs. The plan was sent to the legislature for approval as a work program, and it could take five years before work began on the projects.³⁴ Resource agencies were not involved in the process until environmental documents were distributed, at which point project plans were usually already very detailed. The shortcomings of this process included inflexibility in project plans, long timelines, late agency involvement, and inefficient use of planning information and community preferences in the project development and environmental stage. ETDM changed the process to involve resource agencies in planning as soon as mobility needs are expressed by transportation agencies. It eliminates long time lags between planning and permitting by enabling early NEPA reviews and advanced avoidance and mitigation recommendations from resource agencies. Florida was able to implement these decision-making process modifications through the series of institutional arrangements discussed above.

4.1.5 Lessons Learned

The ETDM process enjoyed the benefit of high-level political support, a relatively large budget, and technical capacity. Officials from state environmental protection, transportation, and community affairs agencies, and various regional agency administrators at the federal level, all participated in an initial planning summit for ETDM. Such high-level support ensured that the necessary funding and staff resources were available to support its development and implementation. It was not a minor

³⁴ "Florida's ETDM Process: Efficient Transportation Decision Making While Protecting the Environment"
<http://etdmpub.fl-a-etat.org/help/ETDM.pdf>

commitment: ETDM required five years of development and the expenditure of approximately \$3 million.³⁵ While this sum is relatively small compared transportation project investments statewide, it does represent a significant expenditure, which again points to the importance of high-level support. Finally, ETDM relies both on accurate GIS data and tools to manage and share data and information. For this component, FDOT has been fortunate to be able to harness the technical capacity necessary to realize the ETDM process with the help of others, including the University of Florida.

But while ETDM exemplifies many characteristics of an integrated planning framework, it does not engage local land use agencies directly. While ETDM excels at incorporating resource agency outputs into transportation plans, it does not incorporate local land use decision-making into the overall process. For example, only state and federal agencies are signatories to the MOUs that govern ETDM. Cities and counties are involved in the ETDM indirectly through relationships with MPOs, who then participate in ETDM. This indirect pathway of involvement for cities and counties puts the burden of raising land use concerns mainly on the public involvement process.³⁶ Florida has noted this as an issue and hopes in the future to further and more substantively involve local land use planning in the ETDM process. To comply with Florida laws, local and county governments already create comprehensive land use plans that address environmental concerns, creating an opportunity as well as a desire for integration. In fact, FHWA's Florida Division office hopes that EDTM outputs can eventually be used in the creation of local land use plans.

4.2 Oregon: Major Bridge Replacement Program

4.2.1 Background

Oregon DOT (ODOT) has sought to streamline the replacement process for approximately 350 bridges across the state, which ODOT is accomplishing under the auspices of one consolidated Major Bridge Replacement Program. The agency's strategy is to embed environmental stewardship concepts throughout the project planning and development processes, creating "context sensitive and sustainable solutions" in the hope that combining these solutions with programmatic state- and federal-level environmental reviews will facilitate faster project implementation. The programmatic reviews involve a tiered NEPA analysis that collectively gathered environmental and engineering data for all bridge sites, in exchange for individual analysis that includes fewer requirements. ODOT expects that the tiered analysis will help avoid ecologically sensitive areas and create meaningful mitigation projects, and that through the resulting programmatic reviews the agency will be able to reduce the program's delivery cost by ten percent and complete the replacements two years ahead of schedule.³⁷

ODOT has developed four initiatives to accomplish its stewardship and streamlining goals relating to the bridge replacements:

³⁵ Interview with FDOT, November 12, 2004.

³⁶ Interview with FHWA Florida Division, August 17, 2004.

³⁷ FHWA. 2004. Successes in Streamlining Newsletter. "Bridging Multiple Objectives: The Oregon Major Bridge Replacement Program" <http://environment.fhwa.dot.gov/strmlng/newsletters/sep04nl.htm>

1. Mapping to avoid impacts to sensitive areas where possible,
2. Promoting a statewide mitigation and conservation program through mitigation banking,
3. Obtaining agreement on performance standards, and
4. Developing a ‘one-process’ approach to permitting.

The four initiatives employ strong institutional arrangements and applications of data and tools to enable key decision process modifications in an integrated planning process.

4.2.2 Institutional Aspects

The Bridge Replacement Program relies on a number of institutionalized coordination efforts between ODOT and resource agencies. First, together with ACE, NOAA Fisheries, FWS, and Oregon State Lands, ODOT has developed environmental and aesthetic performance standards for bridge designs. These standards will be used for each individual Bridge Replacement Program project, thus institutionalizing design commitments for environmental and aesthetic concerns. Second, the ‘one-process’ approach to permitting is based on batched programmatic permits and agreements, including a joint Endangered Species Act (ESA) biological opinion with FWS and NOAA Fisheries, a Regional General Permit with ACE, and a similar programmatic permit for state archaeological excavations. These agreements institutionalize the streamlining element of the Bridge Replacement Program, committing resource agencies to simplify subsequent environmental requirements. Lastly, integrated approaches to mitigation banking have been formally institutionalized; ODOT and resource agencies have agreed to combine wetland mitigation and ESA conservation requirements, and to jointly determine conservation priorities and identify multiple new sites for mitigation banking. All of these arrangements and agreements have served to strengthen ODOT’s relationships with resource agencies and build early commitments on both sides.

4.2.3 Data and Tools Aspects

The Bridge Replacement Program’s planning process for avoiding environmentally sensitive areas makes heavy use of GIS technology. As part of this work, ODOT is creating a GIS database of baseline environmental reports for a 90-acre area around each bridge undergoing replacement. The environmental context data contained in these reports will be combined with cultural resource and endangered species information, building a natural and cultural resource inventory whose utility can be extended beyond the Bridge Replacement Program. The Program has allowed Oregon to develop a statewide database of environmental and engineering information that will be shared with the public, after locations of sensitive endangered species and archeological resources are removed.

4.2.4 Decision Process Aspects

ODOT’s one-process approach to the Bridge Replacement Program has allowed it to modify its planning, design, and development procedures. The assessment being conducted as part of the planning process includes collection of environmental and

engineering data, as well as cost and scope-of-work estimates for each bridge. While in the past, resource agencies have felt the need to be involved in developing engineering and design specifications for transportation projects to ensure environmental stewardship, ODOT and resource agencies working on the Program agreed on basic performance standards to apply to all bridges. In addition, the combined resources of the Program have allowed ODOT to develop a comprehensive mitigation banking plan for the first time, pooling mitigations together for more effective environmental outcomes. These commitments from ODOT have helped to produce reciprocal commitments from resource agencies through programmatic permits and agreements, satisfying many environmental review requirements at one time.

Because of these changes, the process for advancing individual bridges through project implementation has been simplified. Design teams working on the replacements only need to perform a preconstruction assessment for each bridge that meets the standards, and send preliminary designs to the appropriate agencies for approval, rather than completing full-blown environmental analyses and consultations.

4.2.5 Lessons Learned

The Bridge Replacement Program represents significant upfront time and resource commitments for integrated planning and analysis. But the pooling of resources that would otherwise be spent incrementally on individual project-related activities has enabled ODOT to direct larger amounts of resources toward more effective, larger-scale conservation activities. Furthermore, based on the expected savings from reduced work and compressed time schedules in subsequent individual bridge projects, ODOT's initial investment in streamlining appears poised to reap high returns.

4.3 Texas: Environmental Resource Stewards (TERS) and Ecological Assessment Protocol (TEAP)

4.3.1 Background

The Texas Department of Transportation (TxDOT) has been preparing plans for the new Trans-Texas Corridor (TTC), which calls for a new statewide transportation network over 4,000 miles in length (1,000 miles of which will be highway Interstate 69). TxDOT has chosen to assess the environmental impacts of all 1,000 miles of I-69 by using a tiered NEPA approach. To assist planning activities on this scale, the Texas Environmental Resource Stewards (TERS) was formed in 2002 at an executive-level meeting of officials from transportation and resource agencies and the governor's office, as well as other stakeholders. TERS is a multi-agency collaborative approach to improve the state's efforts to identify and avoid important ecological resources while simultaneously streamlining regulatory processes. At the recommendation of an interagency executive leaders group, TERS focused on:

- Process changes to facilitate ecoregion-level (or broad level) mitigation and permit streamlining for large projects, and
- A new, GIS-driven ecological assessment method called the Texas Ecological Assessment Protocol (TEAP).

The TERS have brought environmental considerations into the early stages of the transportation decision-making process and fostered better utilization of data and tools in integrated processes.

4.3.2 Institutional Aspects

Interagency collaboration among resource and transportation agencies was essential to TERS' success. A wide range of transportation and resource stakeholders took part in TERS including representatives from TxDOT, EPA, ACE, FWS, FHWA, Texas Parks and Wildlife Department (TPWD), the Texas Commission on Environmental Quality (TCEQ), the Texas Governor's Office, and the Nature Conservancy of Texas. This broad range of stakeholders ensures that a variety of concerns are considered in the approach. And as an institutionalized body that meets on a regular basis, the TERS executive leaders group is able to make high-level evaluations of the results of process changes over time, and make additional adjustments as necessary. Finally, through funded position arrangements with TxDOT, resource agencies are able to provide the staffing resources necessary to participate effectively in I-69 activities.

4.3.3 Data and Tools Aspects

A major advancement to come out of the TERS approach is the Texas Ecological Assessment Protocol (TEAP). This process utilizes GIS and electronic data to identify ecologically important areas that transportation agencies should strive to avoid in broad-level planning activities, such as the Tier 1 NEPA process. To take into account Texas' large land area and high variability in ecosystems, TEAP functions on an 'ecoregion' scale appropriate for large-scale analysis.³⁸ TEAP makes use of several databases and GIS layers and is based on three criteria: the diversity, rarity, and sustainability of ecological resources found in each of 18 ecoregions. TEAP is also open-ended, and thus able to accept updates for new or improved data sources from participating agencies.

4.3.4 Decision Process Aspects

The inter-agency collaboration fostered by TERS and the assessment tool developed by TERS has enabled important changes to the transportation decision-making process. By identifying potentially sensitive areas early in the I-69 corridor planning process, rather than in the project development phase, TxDOT is attempting to expedite the project development process while minimizing the project's environmental effects. To accomplish this early screening, the TERS executive leaders group meets semi-annually discuss potential mitigation opportunities and other issues. While TERS executive leaders have noted that agreeing on criteria for the development of TEAP has been difficult, the involvement of leaders from each agency who all support the process has helped to build consensus and enable forward progress.

³⁸ Osowski Sharon L. et al.2004. "Texas Ecological Assessment Protocol (TEAP) Model: An Ecoregion-Scale Landscape." Presentation abstract at the U.S. International Association for Landscape Ecology 19th Annual Symposium, Las Vegas. March 30 - April 2, 2004.
<http://abstracts.co.allenpress.com/pweb/usiale2004/document/?ID=33740>

TERS efforts are assisting the development of the TTC and I-69 by using the TEAP to identify ecologically important areas that should be avoided by transportation corridors. TEAP may also assist in identifying areas for compensatory mitigation opportunities projects such as I-69. This has allowed the Texas Project Development Process Manual to be revised to incorporate the tiered environmental approach used in the I-69 NEPA process. The Tier 1 environmental process will result in preferred corridor location decisions using input from TERS as well as other tools and data sources, and the Tier 2 environmental process will include the detailed analysis required for the specific design and construction decisions on I-69. TxDOT is utilizing the TERS approach and TEAP assessments in the hope that the resulting potential corridor locations will be more environmentally sensitive choices, enabling streamlined Tier 2 reviews.

4.3.5 Lessons Learned

The TERS approach represents a successful attempt to foster better integration between transportation and natural resource agencies. TERS demonstrates the power of executive-level involvement in bringing together the resources necessary to conduct ecological analysis, as well as creating opportunities for modifications within the processes that govern transportation and resource planning.

But the TERS experience also offers two instructive insights. While TEAP functions well as a cost-effective screening tool for transportation agencies at the ecoregion scale, its technical capabilities are not suited, or even meant to be suited, for determining site-specific ecosystem characteristics or producing exhaustive lists of environmental concerns for all locations. Application of TEAP to other kinds of analyses beyond screening should recognize these technical limitations, and such limitations should be communicated to avoid misinterpretations of TEAP outputs. In addition, the TEAP approach does not include integration with local land use decision processes. Communities in Texas are experiencing high growth, and the effects of that growth on the transportation system, and the environment, are beginning to manifest. Opportunities and incentives for local land use planning agencies to participate in the system would create a more integrated planning framework.³⁹

4.4 Indiana: I-69 Long-Range Plan

4.4.1 Background

Indiana DOT (INDOT) is in the process of planning for the construction of Interstate 69, a major north-south highway that will traverse the entire state. The route for Interstate 69 was generally defined by Congress in ISTEA. To tackle the project's massive planning and permitting challenges, INDOT has chosen to utilize several strategies to increase early consideration of environmental concerns. INDOT is working with local communities along I-69 to manage and stimulate growth in selected areas, as well as to identify environmentally sensitive areas that warrant protection. INDOT is also using a tiered NEPA approach for the project, and is developing mitigation banks for both forests and wetlands. Finally, in partnership with the Indiana Geological Survey, INDOT has

³⁹ Interview with FHWA Texas Division, 8/24/04

compiled a GIS application to support its long-range planning and project permitting activities. The success achieved with this tool for the I-69 project has prompted its expansion into a statewide GIS application for use in future project-level planning across the state.

4.4.2 Institutional Aspects

INDOT has made several institutional arrangements with resource agencies to streamline its I-69 NEPA approach. Resource agencies have been supportive of INDOT's decision to use a tiered approach to NEPA and other requirements, and have been involved with the tiered process in many different ways. The level of detail for Tier 1 analysis, for example, was determined in consultation with resource agencies. As a result, EPA, ACE, and the Indiana SHPO have stated that the tiered approach to I-69 is consistent with NEPA, NHPA Section 106, and CWA Section 404 requirements, and that the Tier 1 analyses provided sufficient information to select a corridor for the highway.⁴⁰ Resource agencies have also worked with INDOT to develop Tier 2 permitting procedures. While ACE has not issued a general 404 (b) (1) permit for I-69, EPA, ACE, FHWA, and INDOT have developed a common understanding of the process that will be followed and the requirements that will need to be met when actual permit applications are filed following Tier 2.

Section 106 consultation is also taking place in two tiers. In consultation with the Indiana SHPO, INDOT, and FHWA have used Tier 1 Section 106 analyses to assist in selecting and, where necessary, shifting corridor locations, as well as develop agreed-upon procedures by which more detailed studies and final boundary determinations will take place in Tier 2. Other requirements have actually been fulfilled under Tier 1. For instance, FWS has completed a biological opinion that states that I-69 does not jeopardize the continued existence of any threatened or endangered species, streamlining the ESA consultation procedure for the project on a whole. Overall, through such early coordination, INDOT expects to save time and money in the project development stage.

Also, recognizing that environmental stewardship depends in part on the participation of local land jurisdictions, INDOT has developed the Community Planning Program (CPP).⁴¹ The CPP entails two phases of planning work. Phase 1 convenes a regional discussion for communities affected by I-69 about strategies that can address economic growth and environmental conservation of sensitive areas. Phase 2 allows INDOT to assist local communities to carry out regional strategies by distributing grants to support local planning processes that implement local policies supportive of regional goals. In this way, INDOT is able to use its institutional position to initiate a regional growth discussion that draws on information gathered as part of its I-69-related GIS work. This has helped to infuse local land decision processes with important environmental information. Moreover, by distributing grant funds, INDOT is able to share the resources that are necessary to conduct and implement local land planning in support of regional goals for growth and environmental conservation.

⁴⁰ I-69 Evansville to Indianapolis, Indiana Tier 1 Record of Decision - Appendix B.
http://www.deis.i69indyevn.org/ROD/pdf_files/Appendix%20B%20-%20Responses%20to%20Comments%20on%20FEIS.pdf

⁴¹ INDOT. I-69 Community Planning Program. http://www.in.gov/dot/div/planning/I69_planning.pdf

4.4.3 Data and Tools Aspects

INDOT's GIS assessment tool utilizes over 170 different geospatial data layers. These layers include information on environmental and historical resources, socioeconomic conditions, and geologic features. Information from state and federal agencies was edited and formatted to be compatible with Indiana's GIS platform. Although this application was first developed to help southwestern Indiana complete Tier 1 analysis of the I-69 project, it proved useful enough to inspire a statewide expansion of GIS usage in planning.

The state now has a comprehensive GIS system, called the Indiana GIS Initiative, available online and free of charge to the public and state and federal agencies for use in planning efforts. The Indiana Geological Survey, INDOT, FHWA, and Indiana University-Purdue University Indianapolis (IUPUI) have collaborated to provide information to communities interested in implementing Smart Growth principles, such as data on land cover, demographics, brownfields, environmental and natural resources, economic development, and infrastructure. The Indiana GIS Initiative also strives to help users track trends in development. It provides land use cover and land use change maps to every county in the state to show communities a 'bird's-eye view' of development patterns in their areas, providing valuable information for decision processes regarding future growth.

4.4.4 Decision Process Aspects

The arrangements and tools employed by INDOT will improve the overall I-69 decision process. First, they make INDOT's tiered NEPA and permitting approach possible. INDOT has completed a Tier 1 Final EIS for the Evansville-to-Indianapolis portion of I-69. Achievements include a biological opinion from FWS, permitting procedures with ACE and the SHPO for subsequent phases of the project, and a \$77 million mitigation program.⁴² This mitigation program includes improvement of bald eagle habitat, context sensitive designs, new wetland creation, and permanent forest protection. The Tier 1 phase was completed with the help of landscape-scale mapping using Indiana's GIS application to highlight areas containing environmental and historical resources that should be avoided. Using landscape-scale data collection, Tier 1 provided enough information to select a new highway corridor that minimizes impacts to environmentally sensitive areas. The Tier 2 environmental analyses will involve more detailed studies, the selection of one preferred alignment, and preparations for formal permitting activities.

Second, the CPP and GIS application will help change the planning environment by engaging local communities to develop land use plans that address goals for economic growth as well as for environmental conservation. It is hoped that these efforts will in turn provide a more environmentally sensitive backdrop against which transportation projects are planned, opening early and broad-based dialogue about economic growth and environmental conservation that facilitate transportation project development.

⁴² INDOT Office of Communications. 2003. "I-69 Study Marks Major Milestone with Final Environmental Impact Statement". <http://www.in.gov/serv/presscal?PF=dot&Clist=6&Elist=75387>

4.4.5 Lessons Learned

The development and permitting of the new I-69 in Indiana provides a good opportunity for INDOT to bring together multiple stakeholders with interests in economic growth, transportation, land development, and environmental conservation. Its achievements so far include initiating growth management efforts at the local level, and development of a GIS-driven long-range planning tool. While significant resources were needed to achieve these outcomes, and while INDOT enjoyed unusual amounts of technical and other support from a local university, the I-69 experience shows how a transportation agency can leverage its funding resources and relationships with multiple stakeholders to initiate an informed regional dialogue that involves local land use decision-makers, thereby promoting multiple objectives in the planning process.

4.5 North Front Range: Regional Plan

4.5.1 Background

As a response to fast-paced growth in the region, the North Front Range Transportation and Air Quality Planning Council has begun to incorporate land use, transportation, and environmental concerns from a broad range of stakeholders into its transportation system planning processes. The Council hopes to engage local land jurisdictions, Colorado DOT (CDOT), FHWA, and resource agencies to develop an integrated planning approach that provides system capacity, alternative transportation choices, and interconnectivity with other regions in a manner that balances transportation, land use, and resource conservation objectives. Initiatives the Council is undertaking to promote this integration include “Envision the North Front Range,” a visioning process for future land use and transportation, and GIS mapping of natural resources, infrastructure, and land use that feeds into the visioning process. Some of this work has already been incorporated into the region’s regional transportation plan (RTP) process, out of which has come regional goals to reduce single occupancy vehicle travel and foster stronger connections between land use and transportation planning. The Council is aiming to continue to evolve future planning processes to more closely integrate these initiatives.

4.5.2 Institutional Aspects

The Council relies on strong institutional arrangements to draw participation from stakeholders throughout the region in the planning process. First and foremost, its membership board includes representatives from county and city governments, the Colorado Transportation Commission, and the Colorado Air Quality Control Commission—enabling many voices to be heard. Second, two advisory bodies provide expertise to the Council: its Technical Advisory Committee (TAC), comprised of local public works and engineering staff; and the Transit Advisory Group (TAG), comprised of staff from transit providers in the region. In addition, the Council is convening a new advisory body called the Land Use Transportation Air Quality (LUTRAQ) Committee, whose members will be local transportation, air quality, and land use planners, and which expects to begin meeting in early 2005.⁴³ The LUTRAQ Committee will be tasked with

⁴³ Interview with North Front Range MPO Regional Transportation Planning Manager, September 28, 2004.

devising ways to better link land use and transportation planning, and could in the future serve as a regional forum for discussing development issues, as well as the vehicle for building consensus on regional responses to growth pressures. The LUTRAQ Committee holds promise as an institutional mechanism to achieve integration.

Finally, the Council also intends to execute MOUs with resource agencies that create a common understanding of how agencies will interact within an integrated planning context, including data-sharing activities and participation in integrated planning processes.

4.5.3 Data and Tools Aspects

The Council uses a land use visualization package, called CommunityViz, to help clarify impacts of future growth and transportation projects on land and water resources. CommunityViz models the distribution of employment and households, allowing the results of different policies to be shown visually. CommunityViz not only provides analysis, but also serves as a public involvement tool, enabling stakeholders such as EPA, ACE, and the general public to literally see the effects of land use and transportation strategies. This public involvement aspect has been seen as a success in raising public awareness about the effects of and options for regional growth.

Some environmental information currently exists in GIS formats that CommunityViz already accesses for analysis, such as slope and floodplain layers. With the help of resource agencies such as FWS and the Colorado SHPO, the Council plans to expand this existing information with more comprehensive GIS inventories of natural and cultural resources. Once created, it is expected that these inventories, along with the existing geographic information, will be housed and maintained by CDOT, and that the Council will access the inventories in future planning processes, potentially for future CommunityViz analysis. The inter-agency MOUs are expected to institutionalize future data-sharing arrangements among agencies.

4.5.4 Decision Process Aspects

By using these new institutional mechanisms and applications of data and tools, the Council aims to make two important changes to the transportation decision-making process. First, the Council hopes to examine proposed projects against the newly gathered inventories of natural and cultural resource before these projects are added to the Transportation Improvement Program (TIP). The inter-agency MOUs are expected to clarify agency roles in such analysis, which may take place within the Council's existing process for analyzing regionally significant corridors. The aim of this change is to identify environmental concerns early in the transportation decision-making process so that any important conflicts are discovered before significant effort is expended, and that the resulting projects are more sensitive to resource concerns, and require less attention in the project development stage.

Second, the formation of the LUTRAQ Committee and the evolving use of CommunityViz as a tool in planning processes are expected to position the Council and local communities to more proactively address regional growth issues. It is hoped that

this more proactive stance will create changes in the planning context that enable subsequent transportation solutions to become more sensitive to resource concerns.

4.5.5 Lessons Learned

While some of this work is still in progress, the Council is making significant strides toward developing an integrated planning framework for the region by bringing a regional growth discussion and information natural and cultural resources into the transportation planning process. It remains to be seen whether or not the Council, local jurisdictions, resource agencies, CDOT, and FHWA will be able to institutionalize commitments to implement the vision and goals identified in the RTP. But the Council's targeted progressions in institutional arrangements and applications of data and tools to effect changes in transportation decision processes appear promising for advancing the region toward a more integrated planning framework.

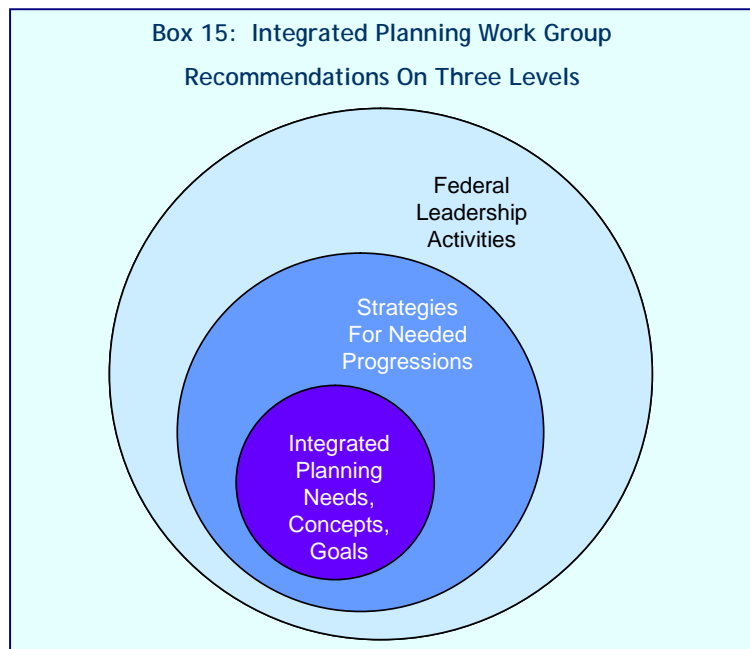
5. Moving Toward an Integrated Planning Framework

Integrated transportation planning entails collaborative, well-coordinated decision-making processes that solve the mobility and accessibility needs of communities in a manner that optimizes across economic development, community livability, environmental protection, and social equity goals. It entails striving to provide viable choices to the users of transportation systems, and to provide information on the performance of transportation networks and facilities that reflects what customers value most.

In addition to the challenges associated with current transportation decision-making processes, this report has identified a number of challenges that stand in the way of a more integrated transportation planning approach. First, awareness among agencies of the planning outputs of other agencies is limited. Second, mechanisms and legal frameworks to engage resource agencies early in transportation planning generally are lacking. Third, resource agencies are constrained by institutional structures that have not been supportive of collaborative planning processes. Fourth, all agencies are constrained by available resources, making additional planning efforts difficult to implement. Fifth, local land use is sensitive to fiscal, economic, and political pressures that may interpret federal and state goals as interference in local matters. These challenges make it particularly difficult to develop an approach that integrates fully across the factors that most affect human ecosystems and how our communities develop.

This report on the Integrated Planning Work Group's activities regarding Priority 1 – Establish Baseline has identified three levels of recommendations for consideration by the Interagency Task Force. As depicted in Box 15, the three levels include:

1. Recommendations on the components of an integrated framework and the associated objectives and outcomes that should be pursued and that should ensue;
2. Recommendations on the types of strategies that can be implemented readily to achieve objectives and to make progress toward integrated decision-making; and
3. Recommendations on specific Federal government activities to begin forging an integrated planning approach.



These levels of recommendations are explained in the sections that follow.

5.1 Integrated Planning Needs, Concepts, and Goals

The first level of recommendations is to gain agreement on the integrated planning framework as described in this report. The first task of the Work Group was to build consensus around a common understanding of the concepts and goals of integrated planning. The first level, then, is the recommendation to define an integrated planning framework as consisting of:

- Integration with land use planning and across transportation modes and pavement and non-pavement capacity enhancement options (i.e., taking a “transportation-as-a-system” perspective),
- Integration of the transportation system with other human and natural systems (i.e., proactively addressing transportation’s relationship with the other systems that define communities),
- Integration of transportation planning with transportation programming and project development (i.e., developing integrated decision-making processes), and
- Performance monitoring and evaluation (i.e., ensuring that: 1) commitments are adhered to; 2) facility, corridor, and network performance is measured in accordance to what customers’ value; and 3) monitoring include environmental effects and the progress toward environmental goals).

5.2 Strategies For Needed Progressions

The second level of recommendations involves gaining agreement on the strategies to facilitate the progressions necessary to resolve the challenges to integrated planning and to advance the state of planning toward an integrated framework. Drawing on the results of a comprehensive literature review and analysis, a review of relevant laws and regulations, process mapping exercises, and interviews with 75 transportation and environmental resource agency practitioners, Chapter 3 of this report identified the strategies that can help to overcome challenges to integrated planning. The second level, then, is to adopt the following strategies.

- Transportation and resource agencies should use each other’s planning outputs as inputs into their own planning processes;
- Innovative institutional mechanisms that are grounded on strong and effective leadership, that define clear and multiple points of interaction, and that ensure the formulation of early and sustained commitments should be developed;
- State-of-the-art technology, including Geographic Information Systems (GIS) and Remote Sensing, should be used to assemble, store, manipulate, analyze, display, and share geographically referenced information and allow for integration of transportation, social, economic, and environmental data as a means to take an integrated perspective in developing plans, programs, and projects; and
- Effective, collaborative, and transparent decision-making processes that take advantage of the outputs of resource agencies, the leadership and commitment of innovative institutional arrangements, and state-of-the-art information systems should be designed and implemented.

Integral to the success of these strategies is the use of both incisive analysis tools for understanding transportation behavior and the consequences of transportation solutions packages, as well as system performance measures that can be applied to gauge environmental protection. Progress has already been made on these fronts, but there is a need for continual refinements as our understanding of interactions between human and natural systems continues to improve.

These concepts and strategies are being put to real-life tests in communities across the nation. From Florida to California, transportation and environmental resource agencies are implementing strategies such as these to make progress toward an integrated, systems-oriented transportation decision-making process. These new approaches to doing business are designed to improve the quality and timeliness of transportation solutions.

5.3 **Federal Leadership Activities**

Finally, the third level of recommendations presented in this report is to gain agreement on a set of activities that could be undertaken by the federal government to advance the state of planning practice. The federal government can play a key role in ensuring that such practice becomes the norm rather than remaining the exception. By mobilizing the federal government's resources and influence, federal agencies can 1) ensure that the spirit of current laws and regulations, which govern transportation planning and that inherently support integrated approaches, is carried over into practice, 2) motivate collaboration and coordination amongst relevant federal agencies, 3) organize and mobilize resources to develop advanced information systems, 4) develop and deliver capacity-building programs that draw on the experiences of state and local transportation and environmental resource agencies, 5) fund pilot projects on innovative decision-making processes that push the envelop and that can serve as testing beds, and 6) promote implementation of insightful analysis and performance measures.

Based on the work that has been undertaken as part of this baseline development effort, a number of actionable recommendations for consideration by the Interagency Task Force have been formulated. The third level of recommendations is to accept the following proposals for action.

- **Provide executive-level direction on inter-agency collaboration.** Current institutional arrangements and cultures must evolve for integrated planning to permeate transportation planning practice. Executive-level leadership can have a cascading effect on organizations, and is a powerful mechanism for the Interagency Task Force to promote integrated planning. Grounded on current

Box 16: Executive Order 13352, Facilitation of Cooperative Conservation

On August 26, 2004, President Bush issued Executive Order 13352 on Cooperative Conservation. The EO's stated purpose is to "ensure that the Departments of the Interior, Agriculture, Commerce, and Defense and the Environmental Protection Agency implement laws relating to the environment and natural resources in a manner that promotes cooperative conservation, with an emphasis on appropriate inclusion of local participation in Federal decision-making, in accordance with their respective agency missions, policies, and regulations." The EO explicitly instructs executive leaders to work together to promote cooperative conservation among federal agencies.

Although this EO is not a transportation-related initiative, it demonstrates the importance of promoting coordination with similar initiatives through executive-level leadership.

Source: Executive Order 13352, Facilitation of Cooperative Conservation, White House Office of the Press Secretary, August 2004.

legal and regulatory frameworks and the experiences of state and local agencies that have pursued different approaches to decision-making, it is recommended that the Task Force design executive-level collaboration strategies and develop and disseminate guidance on institutional coordination that ‘field’ practitioners (federal, state, and local) can use to develop more effective institutional approaches. One option is to use the Executive Order powers of the President to set the basis for such federal initiatives (see Box 16, above).

- **Develop technical guidance and complementary capacity-building programs on integrated planning.** The process mapping exercise and interviews that were conducted as part of this baselining effort indicate that agencies need to increase their fundamental understanding of each others’ planning processes and associated outputs. Methods are needed for assuring that the outputs of environmental resource plans are used to inform transportation planning. Furthermore, a range of strategies are available for achieving the objectives and outcomes that should characterize integrated planning. It is recommended that the Interagency Task Force develop such methods and strategies, including improved analysis tools and system performance measures, and prepare and disseminate guidance on their application. This should build on work related to the application of technology, such as GIS and remote sensing. Additional options include more regularly providing available regional resource planning outputs to local and state governments as input to their transportation and local land use planning efforts.
- **Develop policy guidance that clarifies how current laws and regulations encourage integrated transportation planning.** It is clear that the current laws and regulations that govern transportation planning recognize the need and set the basis for integrated planning. Yet, a succinct, targeted statement that clarifies and demonstrates how current laws and regulations support integrated transportation planning is not available to guide practitioners. It is recommended that such guidance be developed for both surface transportation and aviation systems planning to ensure that visionary and proactive leaders at the state and local levels have the basis that is necessary to forge cultural change, and to help practitioners better understand how to move toward an integrated approach.

5.4 **Closing Words**

As the efforts of the Work Group on Integrated Planning continue, other perhaps more detailed next steps that warrant further consideration will surface. For instance, three potential points of departure have emerged during the IP WG’s baselining activities. First, the high-level core process mapping exercise conducted as part of the baselining produced a baseline understanding of the planning processes and helped to identify planning outputs relevant for integrated planning. During the exercise, it became apparent that refining the core process maps and developing deeper, more detailed assessments are needed to pinpoint specific opportunities for integration that went beyond the scope of the baselining effort. Yet, such in-depth process mapping could yield valuable insights about the stages within core planning processes that could serve as points for tighter interagency coordination. Therefore, a potential next step of this baselining effort is to conduct a more extensive process mapping exercise to refine the core level process maps as well as to develop in-depth sub-process maps.

Second, as work on strategies to promote integrated planning moves forward, it is expected that differences in the needs and processes for different transportation modes will become clear. Differences between surface and air transportation are noted throughout this report. It is expected that these differences will precipitate separate, more specific recommendations in applying integrated planning concepts by transportation mode. For example, there may be limitations in aviation planning related to locations of existing airports and divisions of responsibilities for planning and environmental analysis. As another example, transit may be constrained by locations of the dense populations that allow transit projects to be successful. Further work should be conducted to explore specific surface transportation and air transportation recommendations.

And third, the examples of innovative practice presented in Chapter 4 point to the potential for the federal government to advance the state of planning practice by underwriting efforts through grant funding for statewide or region-specific demonstration projects. Such pilot projects could demonstrate integrated planning concepts in real-world situations, simultaneously providing proof of concept and developing the requisite tools and institutional mechanisms that will make integrated planning possible on a wider scale. Work should be conducted to explore the benefits and feasibility of such a program. These next steps are seen as the first steps in advancing the Integrated Planning Work Group's efforts.

Appendices

Appendix A: Commonly Used Acronyms

ACE: Army Corps of Engineers

ALP: Airport Layout Plan

AASHTO: American Association of State Highway and Transportation Officials

CAA: Clean Air Act

CWA: Clean Water Act

DOT: Department of Transportation

EIS: Environmental Impact Statement

EPA: Environmental Protection Agency

ESA: Endangered Species Act

FAA: Federal Aviation Administration

FHWA: Federal Highway Administration

FTA: Federal Transit Administration

FWS: Fish and Wildlife Service

GIS: Geographic Information Systems

MOA: Memorandum of Agreement

MOU: Memorandum of Understanding

MPO: Metropolitan Planning Organization

NEPA: National Environmental Policy Act

NHPA: National Historic Preservation Act

NOAA: National Oceanic and Atmospheric Administration

SHPO: State Historic Preservation Officer

TMDL: Total Maximum Daily Load

Appendix B: Integrated Planning Interview Participants

(Total Participants = 75)

Participant	Organization
Vicki Dixon	ACE, Headquarters
Jennifer Moyer	ACE, Headquarters
Kirk Stark	ACE, Headquarters
Lance Wood	ACE, Headquarters
Susan Meyer	ACE, Los Angeles District
Brooks Carter	ACE, Sacramento District
Nancy Kang	ACE, Sacramento District
Jerry Magee	BLM, Oregon State Office
John Mills	BLM, California State Office
Gregg Simmons	BLM, Arizona State Office
Gary Wyke	BLM, Idaho State Office
Mark Brucker	EPA, Air Planning Division, Region 9
Chris Forinash	EPA, Office of Policy, Economics, and Innovation
Mary Kay Santore	EPA, Office of Policy, Economics, and Innovation
Stuart Lehman	EPA, Office of Water, Headquarters
Tracie Nadeau	EPA, Office of Water, Headquarters
Heinz Mueller	EPA, Office of Water, Region 4
Sue Elston	EPA, Office of Water, Region 5
Betsy Higgins	EPA, Region 1
Rosemary Monahan	EPA, Region 1
Tim Timmerman	EPA, Region 1
Jan Monroe	FAA, Central Region
Mark Schenkelberg	FAA, Central Region
John Silva	FAA, New England Region
Jacqueline Sweatt-Essick	FAA, Southern Division
Bill Haas	FHWA, Colorado Division
Brian Allen	FHWA, Federal Lands Division
Jack Van Dopp	FHWA, Federal Lands Division
Pete Field	FHWA, Federal Lands Division
Sabrina David	FHWA, Florida Division
George Hadley	FHWA, Florida Division
Cathy Kendal	FHWA, Florida Division
Sandy Allen	FHWA, Texas Division
Jose Campos	FHWA, Texas Division
Amy Lamson	FHWA, Texas Division
Mike Leary	FHWA, Texas Division

Participant	Organization
Barbara Maley	FHWA, Texas Division
Sharon Love	FHWA, Washington Division
Buddy Cunill	Florida DOT
Donnie Hamilton	Florida DOT
Teresa Ann Ciapusci	FS, Coronado National Forest
Jeanine Derby	FS, Coronado National Forest
Stan Helin	FS, Coronado National Forest
Bob LeFevre	FS, Coronado National Forest
Melissa Shafiqullah	FS, Coronado National Forest
Steve Solem	FS, Intermountain Region
Darin Allen	FTA
Scott Biehl	FTA
Charles Goodman	FTA
Sean Libberton	FTA
Joseph Ossi	FTA
Christopher Van Wyk	FTA
Linda Gerhke	FTA, Region 10
Ken Berg	FWS, Region 1
Emily Teachout	FWS, Region 1
Paul Burke	FWS, Region 3
Lyn MacClean	FWS, Region 3
Mike Litwin	FWS, Region 3
Marella Buncick	FWS, Region 4
Kevin Moody	FWS, Region 4
Scott Jackson	FWS, Region 6
Connie Young-Dubovsky	FWS, Region 6
Andy LoSchiavo	NOAA Fisheries, Habitat Conservation, Headquarters
David MacDuffee	NOAA Fisheries, Habitat Conservation, Headquarters
Heather Ludemann	NOAA Fisheries, Habitat Conservation, Headquarters
Kathi Rodrigues	NOAA Fisheries, Habitat Conservation, Headquarters
Nan Reck	NOAA Fisheries, Headquarters
Michael Tehan	NOAA Fisheries, Portland, Oregon Field Office
Rodney Little	SHPO, Maryland State
Beth Cole	SHPO, Maryland State
Ruth Pierpont	SHPO, New York State
Allyson Brooks	SHPO, Washington State
Mark Epstein	SHPO, Ohio State
Nancy Schamu	National Conference of State Historic Preservation Officers